BUREAU OF FISHERIES

REPORT OF

THE COMMISSIONER OF FISHERIES FOR THE FISCAL YEAR 1910

AND

SPECIAL PAPERS

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Commissioner

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REPORT OF THE COMMISSIONER OF FISHERIES FOR THE FISCAL YEAR ENDED JUNE 30, 1910

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REPORT

OF THE

COMMISSIONER OF FISHERIES.

Department of Commerce and Labor,
Bureau of Fisheries,
Washington, August 24, 1910.

Sir: I have the honor to submit herewith a report of the operations of the Bureau of Fisheries for the fiscal year ended June 30, 1910.

GENERAL CONSIDERATIONS.

This Bureau was organized as the United States Fish Commission in February, 1871, and on June 30, 1910, therefore, it completed the fortieth fiscal year of its existence. Originally clothed solely with functions of investigation and inquiry into the reputed or real decrease in the food fishes of the coastal and interior waters, it soon manifested that it could perform important service in actually increasing the supply of such fishes. In recognition of this fact acts of Congress from time to time have enlarged the functions of the Bureau until to-day the purely practical work of increasing and conserving aquatic food resources through cultural and experimental operations has become the dominant feature of the Bureau's activities.

For a long while wholly relieved of executive control of the fisheries by reason of the constitutional reservation of that right to the States, the Bureau recently has been invested with the administration of the important fisheries of Alaska, including the entire control of the Pribilof Islands and the fur-bearing animals of the Territory at large.

The steady increase in the volume and importance of the Bureau's work has been especially rapid in the past ten years, and the fiscal year just closed, which witnessed a drastic change in the control of the seal herd, has added considerably to the sum of the Bureau's duties. The probable adoption of joint international regulations in respect to the fisheries of the waters contiguous to our northern boundary presents the possibility of a great enlargement of the

Bureau's executive functions in the near future. Each year brings increasing demands from the several States for aid and advice in respect to the drafting of laws and regulations, the establishment of state fishery services, and the best measures for the conservation and development of fishery resources, and the Bureau feels that its influence for good in matters relating to the fisheries is yearly becoming more important. The salient features of the work during the fiscal year are exhibited in the following pages.

PROPAGATION OF FOOD FISHES.

EXTENT OF WORK.

It is gratifying to be able to record another successful year in fish-cultural work. Methods have not varied appreciably from those of former years, and attention has been directed principally to enlarging the output.

The widespread and increasing interest taken in the Bureau's work by people in all sections of the country and the growing conception of the benefits resulting from the stocking of public and private waters are manifested by the large number of applications for fish received during the year, the number being 10,635, an increase of 523 over 1909.

Work was conducted at 35 permanent stations and 86 field and collecting stations, located in 32 States. With reference to the fishes propagated, the regular hatcheries may be classified as follows: Marine species, 3; river fishes of the eastern seaboard, 5; fishes of the Pacific coast, 5; fishes of the Great Lakes, 7; fishes of the interior, 15.

The results of fish culture depend largely upon climatic conditions, the most elaborate and carefully executed plans ending in success or failure according to the state of the weather in the spawning season. In 1910 these conditions were generally unfavorable, resulting in the curtailment of egg collections of most of the important species, but owing to the superior quality of the majority of the eggs obtained, the Bureau was able to exceed its record year of 1909 by 126,800,000, or 4 per cent, the total output of fish and eggs being in excess of 3,233,000,000. This was accomplished without increased funds, the available appropriations being the same as in the preceding two years, and was made possible largely through the faithful and efficient service rendered by the Bureau's employees in their several lines of work.

The following is a table summarizing the distribution of fish and fish eggs for the year. Of these, 443,177,000 eggs and 7,425 fish were delivered to various state fish commissions, and 600.000 eggs of salmon and trout were shipped to foreign countries.

SUMMARY OF DISTRIBUTION OF FISH AND EGGS, FISCAL YEAR ENDED JUNE 30, 1910.

Species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Total.
Catfish			544,350	544,350
Carp			22,710	22,710
Buffalofish			201,475	201,475
Shad	2,160,000	89,076,000		92,236,000
Whitefish	55,428,000	195,964,000		251,392,000
Lake herring	1,440,000	70,300,000		71,740,000
Silver salmon	375,000	10,918,025		11,293,025
Chinook salmon	37,531,417	16,342,556	67,525	53,941,498
Blueback salmon	100,000	121,136,995	21,719,600	142,956,595
Steelhead trout	250,000	3,570,287	179,718	3,900,005
Humpback salmon		1,368,000		1,368,000
Rainbow trout	536,494	552,716	1,771,128	2,860,338
Atlantic salmon	5,000	1,217,366	238,212	1,460,578
Landlocked salmon	115,000	985,040	304,364	1,404,404
Blackspotted trout	2,748,550	1,765,834	884,154	5,398,538
Loch Leven trout			68,248	68,248
Lake trout	10,210,000	33,649,622	4,286,150	48,145,772
Brook trout	516,000	7,405,545	4,228,461	12,150,006
Sunapee trout		171,029		171,029
Grayling	25,000	81,000	18	106,018
Pike			43,300	43,300
Pickerel			500	500
Crappie and strawberry bass			414,477	414,477
Rock bass			69,985	69,985
Warmouth bass			792	792
Smallmouth black bass		537,600	113,305	650,905
Largemouth black bass		56,600	679,482	736,082
Sunfish (bream)			345,635	345,635
Pike perch	321,455,000	155,025,000	4,760	476,484,760
Yellow perch	5,200,000	326,885,000	109,245	332,194,245
Striped bass	4,566,000	2,784,000		7,350,000
White bass			6,050	6,050
White perch	16,500,000	338,480,000		354,980,000
Yellow bass			250	250
Sea bass		808,000		808,000
Smelt	4,500,000		9,000	4,509,000
Mackerel		764,000		764,000
Freshwater drum			11,950	11,950
Cod	9,854,000	210,354,000		220,208,000
Pollock		38,140,000		38,140,000
Haddock		712,000		712,000
Flatfish		930,755,000		930,755,000
Lobster	780,000	162,505,000	2,052	163,287,052
Total	474,295,461	2,722,310,215	36,326,896	3,233,332,572

REVIEW OF OPERATIONS.

The conspicuous increases in the output of fish and eggs over the year 1909 were in blueback, silver, and Atlantic salmons, lake trout, lake herring, yellow perch, shad, cod, flatfish, and steelhead trout, the production of the latter three species exceeding all previous records.

There was a slight decrease from last year in the number of chinook salmon liberated from the Pacific coast stations. Notwithstanding a normal run in the Sacramento, the season at the California stations was the poorest for thirteen years, due partly to such low water that the fish were unable to ascend the tributary streams on which the hatcheries are located, and, later, to freshets which carried away the racks and permitted the impounded fish to escape, with the loss of millions of eggs. Two causes are at present militating against the increase of salmon in these streams—the increasing numbers of black bass, which prey upon the young salmon after planting, and the

ascent of the fry by thousands into a recently constructed irrigating ditch, where they are left on the land to die. The only remedy that can be suggested is to plant the fry in the lower reaches of the rivers or establish a large hatchery at tide water, the latter method involving less expense. Unless some action is taken the number of salmon in these rivers will decline rapidly.

Taken as a whole, the work of the Oregon stations was satisfactory, although high water during the spawning of the chinook salmon shortened the season and reduced the collections to slightly below those of the previous year.

At the Washington stations, where attention is devoted chiefly to the sockeye, humpback, and silver salmons and the steelhead trout, the work was augmented by the opening of two new field stations. In Alaska, where the sockeye salmon is propagated, the yield of the two hatcheries was highly satisfactory, especially the Afognak station, operated for the first time this year.

The lake-trout, whitefish, and pike-perch work of the Great Lakes stations, while not equal to that of some seasons, gave better results than had been anticipated in view of the obstacles encountered. Potent factors in the shortage at the Michigan stations were the unusually early spawning season, followed by unfavorable weather, and the necessity of complying with recently enacted state legislation, which stipulates that the operations of the Bureau must be supervised by the state fish and game warden's department and that all eggs must be taken and fertilized by fishermen licensed by that department, thus placing the work in the hands of inexperienced men. Compliance with the provisions of this law curtailed the output of Northville and its substations fully one-fourth. The law also prohibited pike-perch collections on the St. Clair River, one of the Bureau's most productive fields in past years.

At the Duluth station the weather and other conditions were favorable, permitting increased lake-trout work, but whitefish and pike-perch operations on Lake Erie were materially interfered with by storms, although the poor collections of the latter species were offset to a great extent by the superior quality of the eggs secured.

The lobster output from the three marine stations was about equal to that of 1909. The impounded stock at the Boothbay Harbor station was stripped in April, and though the lobsters were in vigorous health the average yield of eggs was smaller than usual, due, it is believed, to their greater activity in the pound during the mild winter and the consequent shedding of many eggs. The construction of two substantial lobster pounds during the year places this station on a greatly improved basis. At the Gloucester and Woods Hole stations, which are not equipped with pounds, the lobsters collected during the fall are cared for in live cars through the winter.

The number of cod fry produced at these stations was nearly 100,000,000 greater than in 1909, the greatest gain being at the Gloucester station, where more eggs than could be handled were obtained from fishing grounds in the vicinity.

The collection of flatfish eggs was the largest ever made by the Bureau, numbering 1,195,911,000, from which 930,755,000 fry were hatched and distributed. At Boothbay Harbor, where this work has only recently been undertaken, the output was increased 100 per cent over that of the previous year.

Other marine species propagated included pollock at Gloucester, haddock at Boothbay Harbor, and mackerel and sea bass at Woods Hole.

In view of the steady decline in the shad fishery in rivers tributary to the Atlantic for the past fifteen years, it is gratifying to be able to record an increased egg collection of this species and a corresponding increase in the output of fry. The results are attributable partly to recently enacted legislation regulating the methods of fishing in the Albemarle Sound and partly to an exceedingly early spring, which started the run of fish in the Potomac River before the pound nets could be equipped, each factor permitting a larger number of fish than usual to ascend to the spawning grounds.

On the Susquehanna River, at one time the Bureau's most productive field, there was no improvement over recent years, emphasizing anew the destructive influences of unregulated fisheries and the necessity for concerted action by the States concerned if any practical results are to be obtained in the rehabilitation of this important fishery.

White and yellow perch were again produced in considerable numbers at the station on the Susquehanna River, and on the Potomac River the output of yellow perch exceeded all previous records, due to the enlargement of facilities for propagating the species.

Owing to the passage of a state law prohibiting the capture of striped bass by commercial fishermen during the spawning season, the Bureau was unable to secure eggs of this species at its California station in 1909, and as this law remains in force no attempt was made to conduct operations in 1910. The prospects are good for effective work with the striped bass in this field, and its propagation will be resumed in the event of a change in the law.

As in previous years, most of the brook-trout eggs handled at the fisheries stations are purchased from dealers, this course having proved more economical in most sections of the country than reliance upon collections from waters available for the purpose. At present only two stations—one in New England and one in Colorado—obtain their supplies of eggs from wild fish, and the fields heretofore

open to them are narrowing each year because of the encroachments of commercial fish culturists. In 1910 Wellington Lake and the Grand Mesa Lakes, heretofore the most productive sources of the Colorado station for eggs of the blackspotted, brook, and rainbow trout, had to be given up to private enterprise.

The Bureau having been requested to undertake the propagation of the blackspotted trout on the Truckee River with the view of replenishing the stock, depleted through excessive fishing, a field station was established at Derby Dam, Nevada, in the winter of 1909–10. In a normal season several millions of eggs might have been obtained, but owing to low water in the river and the destruction of large numbers of eggs by market fishermen the collections amounted to only 1,371,900. These were hatched without unusual losses and the fry deposited in the river. It seems advisable to continue operations here next season, as it is apparently a promising field for fish-cultural work.

Investigation of the streams in Yellowstone Park demonstrates the possibility of greatly extending operations with the black-spotted trout, and it is intended to increase the force of experienced men in this field with the view of making it a source of supply for the Leadville, Spearfish, and Bozeman stations. The work in the park during the past season was entirely satisfactory.

Taken as a whole, the output of the basses, sunfish, and catfish from stations in various parts of the country was good, the improved results being largely due to increased knowledge of the factors governing the successful propagation of these species. The production of pond stations was supplemented by the collections on the Mississippi and Illinois rivers, where, in addition to securing sufficient bass and allied species for restocking many depleted waters, large numbers of other fishes were seined from shallow sloughs formed by the floods and returned to the main streams. If not removed, the fish would perish from drought or cold, and their rescue conserves a valuable local food resource. A new station established at Helena, Ark., late in the summer rescued over half a million fish.

With the view of extending rescue operations over a larger territory, temporary collecting stations have been located at Caruthersville, Mo., and Rosedale, Miss., which will be made permanent auxiliary stations if experience proves favorable. It is believed that similar inexpensive stations can be advantageously established at various points on the Mississippi River from New Orleans to St. Paul, as the field for this work is extensive and the number of fish that can be economically reclaimed from the drying sloughs and lakes is governed only by the amount of money available for the purpose.

Although the propagation and general distribution of carp was discontinued many years ago, the Bureau constantly receives applica-

tions for this fish, and in instances where the waters described are unsuited to other species the requests are complied with by transferring carp from other waters. In this connection it may be interesting to quote from the census records that in 1903 the total catch of carp in the United States was 18,942,763 pounds, valued at $442,255, and in 1908 the total catch was 42,763,100 pounds, valued at $1,135,390.

NEW STATIONS AND IMPROVEMENTS.

Under authority of the act providing for two or more new fish-cultural stations on Puget Sound or its tributaries, a careful investigation has been made and two suitable sites decided on. As soon as title can be obtained construction will begin.

At Holden, Vt., 24.3 acres of land were acquired for an auxiliary to the station at St. Johnsbury, the facilities of which were too limited for the requirements of northern New England.

The opportunities for fish-cultural and biological work in the valley of the upper Mississippi prompted Congress to authorize a station auxiliary to that at Fairport, Iowa, but to be more particularly devoted to propagation and the saving of fishes from overflowed lands. A site of about 31 acres was purchased at Homer, Minn., about 5 miles from Winona, and a pumping plant and ponds are now nearly completed and other buildings begun. The station will be ready for operation at an early date.

Results in the past having warranted the extension of the station at Mammoth Spring, Ark., 10.5 additional acres have been purchased there for the construction of several large ponds, which will soon be ready for use.

At the Fairport, Iowa, biological station much work in grading, construction of roads, and laying out ponds was done. A building 20 by 50 feet, with pebble-dash finish, containing an office, storage room, and small laboratory equipped for experimental work in fresh-water mussel culture, was practically completed during the year. A pumping plant consisting of two gasoline engines and two centrifugal pumps was installed in a small frame building 20 by 30 feet constructed for that purpose. Eleven cement ponds (4 small ones, 6 of medium size, and 1 large one) were also constructed for practical experiments in mussel propagation.

Improvements provided for by special appropriations were made at many of the stations. At Bozeman, Mont., cement hatching troughs were installed in place of wooden ones, in accordance with modern practice, and are giving excellent results. At Boothbay Harbor, Me., a coal house was built, the wharf extended and altered, and the dams at the lobster pound completed. At Erwin, Tenn., a new hatchery was built on modern plans, the old one hav-

ing become badly dilapidated and beyond repair. The new building is a frame structure 32 by 72 feet on a concrete foundation, and contains besides the hatching room, equipped with cement troughs, an office and workrooms. The water-supply and drainage systems have also been improved and extended, and to a considerable degree built in concrete. At Duluth, Minn., a dwelling for the superintendent has been erected which is in harmony with the surrounding private structures of the city and adds to the efficiency and appearance of the reservation. It is a two-story frame structure 32 by 36 feet, containing 7 rooms and basement, with the necessary office facilities. At Greenlake, Me., the new road has been completed, facilitating the distribution of fish and eggs, shortening materially the distance over which it is necessary to haul supplies, and doing away in great part with unreliable boat transportation. At Neosho, Mo., the new pipe line providing an extra supply of water has been completed and connected with the hatchery and ponds in approved manner, and the woodwork about the ponds has been replaced by concrete. It is believed there will be no further trouble with the water supply at this point for many years to come.

At Leadville, Afognak, Yes Bay, and the Pribilof Islands no expenditures of importance have been made for account of special appropriations.

The plans and specifications for the constructions described have been prepared in the office of the Bureau's architect and engineer and the work planned and supervised by him. In addition, various surveys have been made and plotted, and maps and charts of a special nature prepared.

For fish-cultural work on Lake Erie, in connection with the Put-in-Bay station and to take the place of a boat obsolete and worn out, there was built a steel steamboat of the lake tug type 85 feet long, 16 feet beam, and 8 feet 6 inches in depth. The vessel is equipped for the special requirements, has machinery and appliances of approved design, and it is expected will be a valuable addition to the facilities of the Bureau.

ACCLIMATIZATION AND RESULTS OF FISH CULTURE.

After nearly forty years of endeavor to establish the chinook salmon of the Pacific coast in waters of the United States where it is not indigenous, conclusive evidence of success in one instance has come to hand. Within the past year it has been ascertained that the species has become established in Lake Sunapee, New Hampshire, where numerous specimens from 3 to 5 pounds in weight have been taken by anglers. This is undoubtedly the result of a plant made in 1904 by the New Hampshire fish commission, the eggs having been supplied from the Bureau's hatchery at Baird, Cal. Encouraged by the

outcome of this experiment, the Bureau made a plant of 40,000 fingerling chinook salmon in Lake Champlain in the spring of 1910.

There unquestionably has been an increase in Atlantic salmon in the Penobscot River, as evidenced by the results of the Bureau's operations in 1910 compared with 1908 and 1909. Though receiving the catch of a smaller number of weirs the past season, the collection of spawning fish was twice as great as in 1909 and 60 per cent greater than in 1908.

It is believed that owing to the planting of the species by the Bureau pike perch have become sufficiently abundant in the St. Lawrence River to warrant the collection of eggs at the Cape Vincent station, and plans will be made accordingly. The fishermen on Lake Ontario report that lake trout and whitefish, which have been planted extensively by the Bureau, are increasing rapidly, and that numbers of fishermen who were driven to other pursuits by the former depletion of the fishery are resuming operations. In 1908 the catch of these two species was 5,567 pounds, while in 1909 it increased to 12,532 pounds. A corresponding increase is shown in the take of pike perch in this lake.

The following statistics show the increasing catch of the striped-bass fishery in California, the species having first been introduced from the Atlantic coast into the waters of that State in 1879:

Year.	Pounds.	Value.	Year.	Pounds.	Value.
1889	16,296	$4,073	1893	252,454	$13,037
1890	20,119	4,021	1899	1,234,320	61,814
1891	30,674	4,602	1904	1,570,404	92,116
1892	56,209	6,488	1908	1,775,700	134,660

For a series of years it has been the custom at the Baird, Cal., station to select for spawning purposes large fish only, a practice which appears to be developing a larger breed of fish. Chinook salmon of the run of 1909 averaged 20 pounds in weight, an increase of about 3 pounds over the previous run. The possibilities of selective breeding are indicated by this experience.

FISH-CULTURAL RELATIONS WITH STATES AND FOREIGN COUNTRIES.

Several States still continue in force certain laws and regulations in respect to the fisheries which tend to curtail and hamper the activities of the Bureau. In some cases the States show a willingness to mitigate as far as possible the effects of laws which inadvertently interfere with the Bureau's work, but in one or two instances the legislative and executive attitude appears to be unreasonable if not hostile.

With the States in general the relations of the Bureau have always been harmonious, and a system of cooperation has developed which

has been mutually beneficial to the participants and advantageous to the public. Eggs taken and fertilized at the Bureau's stations are transferred to the state fish commissions, by which they are hatched and planted. The Bureau's expenses and difficulties in distribution are thereby reduced and simplified, and the superior local knowledge usually at the service of the state authorities is of value in indicating the most suitable localities in which to plant the fry. On Lake Erie the Ohio and Pennsylvania fishery authorities cooperated with the Bureau in the collection of eggs of the whitefish, lake cisco, and pike perch.

As shown in the following table, the fish eggs allotted to the state commissions during 1910 aggregated over 443,000,000 and were sent into 17 States:

Allotment of Fish Eggs to State Fish Commissions, Fiscal Year ended June 30, 1910.[a]

State and species.	Eggs.
California:	
Chinook salmon	28,764,467
Colorado:	
Blackspotted trout	225,000
Connecticut:	
Yellow perch	5,200,000
Illinois:	
Lake trout	500,000
Whitefish	4,000,000
Pike perch	8,000,000
Rainbow trout	41,264
Michigan:	
Landlocked salmon	20,000
Lake trout	5,000,000
Pike perch	34,280,000
Missouri:	
Brook trout	100,000
Rainbow trout	25,000
Pike perch	2,000,000
Montana:	
Blackspotted trout	550,000
Whitefish	500,000
Nevada:	
Blackspotted trout	422,000
New Hampshire:	
Chinook salmon	100,000
New York:	
Blackspotted trout	50,000
Rainbow trout	41,500
Landlocked salmon	15,000
White perch	15,000,000
North Dakota:	
Steelhead trout	100,000
Pike perch	10,000,000
Ohio:	
Whitefish	18,000,000
Pike perch	170,725,000
Oregon:	
Chinook salmon	6,465,300
Blackspotted trout	175,000
Pennsylvania:	
Silver salmon	75,000
Blackspotted trout	50,000
Whitefish	31,428,000
Pike perch	96,000,000
Washington:	
Steelhead trout	50,000
Brook trout	100,000
Wisconsin:	
Lake trout	4,500,000
Wyoming:	
Blackspotted trout	675,000
Total	443,177,531

[a] Also there were allotted to Michigan 3,500 lake trout, to Oregon 45 blackspotted trout, and to Wisconsin 3,880 lake trout, or a total of 7,425 fingerlings, yearlings, and adults.

In response to requests coming through diplomatic channels the Bureau furnished eggs to the governments of foreign countries as follows:

Country and species.	Eggs.
Argentina:	
Chinook salmon	200,000
Silver salmon	100,000
Sockeye salmon	100,000
Landlocked salmon	25,000
Lake trout	50,000
France:	
Blackspotted trout	10,000
Japan:	
Rainbow trout	110,000
Brook trout	5,000
Total	[illegible]00,000

BIOLOGICAL INQUIRIES AND EXPERIMENTS.

OYSTER INVESTIGATIONS AND SURVEYS.

The field work of the survey of the public oyster beds of James River, Virginia, which was undertaken at the request of the governor and the fish commissioner of Virginia, was brought to a conclusion on September 15, the charts and report were finished on November 30, and the printed report was issued about February 1. This survey was designed to furnish definite data concerning the location, extent, and condition of the public grounds in the James and Nansemond rivers above Newport News and to provide a foundation for needed legislation by the State. The present boundary lines are based on the survey of 1892–1894, and their justice has long been a matter of contention, the oystermen claiming that much productive bottom was omitted from the public grounds, and the planters contending that a large area of barren bottom was included. The present survey could not demonstrate the validity of the first claim, as such bottoms, if they existed, have been long since occupied for planting purposes, but it was shown that about 58 per cent of the present area of the grounds consists of barren bottom and an additional 15 per cent bears oysters too sparsely scattered to be commercially valuable. Of the 26,408.4 acres surveyed, but 7,153 acres can be regarded as actually productive. It was found also that in certain places oyster planters have encroached on the public rocks, and it was evident that in other places adjoining the planted beds the rocks had been depleted by illicit operations.

To release from the public grounds and throw open to rental a considerable area of the barren bottom and to rectify the boundary lines so as to permit adequate policing, the state fish commissioner had an enabling act introduced in the legislature at its latest session. To attain the ends sought, it unfortunately was necessary to exclude from the public grounds a small proportion of the productive bottom, and as the legislature held that this was in contravention of a constitutional provision relating to the oyster beds, the proposed law failed of passage.

At the request of the governor of Delaware, acting in his capacity as chairman of the Delaware Oyster Survey Commission, the Bureau, at the close of the fiscal year, was engaged in a survey of the natural oyster beds of Delaware, the State defraying part of the expenses for necessary temporary assistance. As in the case of the James River survey, the steamer *Fish Hawk* was detailed for the service, and a considerable part of the work was performed by her personnel.

The authorities of Alabama and Mississippi have also requested assistance and advice in connection with the management of oyster

bottoms, and a preliminary inquiry has been made to determine the most profitable and practicable assistance feasible with the resources available to the Bureau.

Cooperation with the Coast and Geodetic Survey and the Maryland Shell Fish Commission in the survey of the oyster beds of Maryland, pursuant to an act of Congress, has been continued, and the field work will be completed early in the next fiscal year. It is believed that the Bureau will have discharged all of its obligations in this connection prior to the end of the fiscal year 1911.

The experiments in the fattening of oysters at Lynnhaven Bay, Virginia, have produced better results than for several years past. During a period when practically no fat oysters could be obtained from the open waters of the bay the experimental claire was regularly producing oysters of very fine quality. In this connection the Bureau is conducting investigations of the food and feeding of oysters which have already developed some unexpected results, throwing light on practical problems confronting the oyster grower. Some minor modifications of the claire were made near the end of the fiscal year, and it is hoped that it will be possible to fatten oysters earlier in the season than has been possible heretofore.

PEARL-MUSSEL INVESTIGATIONS.

The Bureau has continued its investigations of the pearl-mussel beds of the Mississippi Valley, the material depletion of which has seriously threatened the prosperity of an important industry of that region. With the aid of persons connected with various educational institutions of the States principally interested, field parties were established for the examination of various streams in Virgina, West Virginia, Michigan, Indiana, Illinois, Kentucky, Tennessee, Arkansas, Missouri, and Oklahoma. The habits, distribution, abundance, and commercial availability of the mussels found in the several localities were studied with the view of opening new sources of supply for the manufacturers of pearl buttons and for the purpose of laying a foundation for the protection, conservation, and improvement of the existing beds.

Owing to the severity of the weather during the winter, progress in the erection of the biological station at Fairport, Iowa, authorized by Congress near the close of the preceding fiscal year, was less rapid than was desired, but on the improvement of conditions in the spring construction work went on more rapidly, and at the close of the fiscal year mussel-propagating operations were being conducted on a scale promising to yield some practical results. As was pointed out in the preceding report of the Bureau, this station is designed for the study of problems relating to the general fisheries and aquatic biology of

the Mississippi Valley, but particularly for the cultivation of the mussels employed as raw material in the pearl-button industry, a manufacturing interest giving employment to a large number of persons.

Progress has also been made in the construction of the substation at Homer, Minn., which recent investigations show can be employed for various economic purposes connected with the fisheries, in addition to mussel culture.

EXPERIMENTS IN SPONGE CULTURE.

Although the experiments in growing sponges from artificial cuttings have already developed what the Bureau regards as a practical system of sponge culture, work is still being carried on with the purpose of improving the methods and testing the effects of different environments on the rate and character of sponge growth.

The sponges grown in Cape Florida Channel, which, as reported last year, attained an average weight of 1.25 ounces each at the end of twenty-nine months, were found to average 2 ounces ten months later, some of the largest specimens weighing from 3 to 6 ounces each when thoroughly cleaned and dry. The same disparity in the rate of growth of different specimens observed in other localities was found to occur in this place, while at Soldier Key, about 7 miles distant, where the conditions appear to be equally favorable, growth was very slow.

STUDY OF FISH DISEASES.

During the fiscal year the Bureau has continued cooperation with the New York State Cancer Laboratory in the investigation of thyroid tumor or cancer in domesticated fishes. An aquarium with two independent systems of closed-water circulation, with proper means of refrigeration, has been established for the observation of salmon and trout and experiments in inoculation and treatment. Investigation at various stations of the Bureau and at other hatcheries have shown that the disease is even more widespread and general than was suspected. Considerable difficulty has been encountered in obtaining for purposes of experiment a sufficient number of fish above suspicion of infection, and it has been necessary in this effort to secure a quantity of wild trout from remote streams. Owing to the technical difficulties attending this work, which are equal to those retarding the advance of knowledge relating to the cause and nature of cancer in human beings, progress is made only by slow and painstaking steps and by the use of the most approved appliances and methods. For this reason it is highly important that the Bureau should be provided with a well-equipped laboratory

and experimental hatchery, not only for the purposes of the present investigation but for the study of the many other diseases affecting fishes, both under domestication and in a state of nature. The President, in a special message to Congress dated April 9, 1910, urgently recommended an appropriation for this purpose.

During the year the Bureau was called on to investigate epidemics among hatchery fish at Spruce Creek, Pa., and Roxbury, Vt. At the former place the mortality was due in part to the thyroid tumor or cancer before alluded to, but the majority of the deaths were apparently caused by a bacterial infection which the Bureau has found at other places, but which it has not the facilities to study at present. At Roxbury the disease is also infectious and annually causes large losses. The Bureau has likewise made investigations in Pennsylvania, Ohio, and West Virginia upon the kindred subject of the pollution of streams in its relation to fishes and the fisheries.

OTHER INQUIRIES AND EXPERIMENTS.

The investigations of the Pacific coast salmons have materially advanced knowledge of the subjects during the year, particularly in respect to parasitism and the changes in the tissues affecting the food value of the fish at and near the breeding season, and in regard to the relationship of the steelhead trout and rainbow trout.

In connection with the State Geological and Natural History Survey, the Bureau has continued examination of lakes in Wisconsin, with particular regard to the gaseous content of their waters. The relationship of this subject to practical fish culture is highly important, and the data so far obtained have thrown light on certain failures in the acclimatization of fishes, the causes of which have been obscure. The study of the physical environment and habits of the salmon, smelt, and other fishes of Sebago Lake, Maine, were continued, and in response to a request a somewhat similar line of research was undertaken in Sunapee Lake, New Hampshire. In the latter locality there is a considerable fishery for smelts as they ascend the streams to spawn, and it was learned that young chinook salmon planted in the brooks were taken with the smelts.

The survey of the fishing grounds and investigation of the aquatic resources of the Philippine Islands, in which the steamer *Albatross* has been employed since the autumn of 1907, was brought to a conclusion in October, 1909. The vessel returned to San Francisco on May 4, 1910. The Philippine expedition has yielded extensive collections and a large amount of information relating to the fisheries and fishery resources, and the material is now in course of study for the preparation of comprehensive reports on the scientific and economic results.

MARINE BIOLOGICAL LABORATORIES.

The marine biological laboratories maintained by the Bureau at Woods Hole, Mass., and Beaufort, N. C., were open as usual for several months during the summer and fall, and their facilities were availed of by the usual number of investigators. The researches carried on covered a considerable range of subjects and embraced investigations of a number of species of economic importance, including the diamond-back terrapin, fishes, stone crab, quahog or hard clam, oysters, mussels, and seaweeds. The year witnessed the completion of an elaborate report by the director of Woods Hole laboratory on the marine biology of the waters adjacent to the station, embodying the results of investigations carried on for many years.

ALASKA SALMON SERVICE.

The report of the agents at the salmon fisheries of Alaska, which was published in April, 1910, includes the data for the fishing season of 1909, practically all of which was embraced in the fiscal year 1910.

The number of salmon taken during the season was about equal to the catch of 1907, but fully 20 per cent less than the number caught in 1908. In 1909 there were taken 34,692,608 fish of a gross weight of 175,028,594 pounds, as compared with 43,304,979 fish weighing 213,378,570 pounds caught in 1908. The decrease was apparent in all species excepting the king salmon, which exhibited an increase of about 55 per cent. The catch of red salmon was 115,120,670 pounds, as compared with 124,713,630 pounds in 1908; of humpbacks, 37,965,928 pounds, as compared with 60,424,620 pounds; of dog salmon, 9,456,048 pounds, as compared with 18,066,576 pounds; of king salmon, 8,959,544 pounds, as compared with 5,757,246 pounds; and of cohos, 3,526,404 pounds, as compared with 4,416,498 pounds.

The total pack of canned salmon in 1909 was 2,403,669 cases, valued at $9,439,152. There were 45 canneries in operation, a decrease of 5 since 1908, and the total investment in the industry, excluding cash capital, was $8,631,345. In addition to the canned pack, the fishery produced pickled salmon to the value of $208,758, mild-cured salmon valued at $149,300, and some minor products.

The total yield of the salmon industry was valued at $9,796,210, produced by an investment of $9,007,037 and the labor of 11,439 persons.

Owing to the vigilant enforcement of the laws by the agents of the Bureau during the preceding year, there were comparatively few complaints of violations during 1909. Several convictions were obtained for fishing during the weekly close season, but those engaged in the fishery showed a general desire to comply with the laws and the regulations of the Department. The pernicious practice of

"jigging" for salmon, which results in the cruel mutilation of fish which afterwards escape and die, has been stopped, and prohibition has been placed on the tourists' practice of catching in their hands the nutritively useless but reproductively valuable spawning fish struggling up the falls and rapids.

The effort to prevent the waste of edible portions of salmons, the choice parts of which have been pickled under former practices, has been successful, the salteries now pickling the entire fish or utilizing in other ways the edible parts formerly thrown away.

The statistics relating to the operations of the government and private fish hatcheries in Alaska will not be available until the return of the agents from the Territory.

The counting of the salmon passing into Wood River, which was begun in the preceding year, was continued during the run of 1909. The spawning fish numbered but 893,000, as compared with 2,600,000 in 1908, and the catch of fish in Nushagak Bay, to which Wood River is a tributary, was but 4,900,000, as compared with 6,400,000 in the year before. It is estimated that between 6,200,000 and 7,400,000 fish entered the Nushagak basin, and that between 20 and 35 per cent escaped to the spawning grounds, as compared with a total run of between 10,100,000 and 13,600,000 fish and an escape of between 37 and 53 per cent in 1908. From the valuable but still insufficient data so far obtained it appears that for every salmon reaching the spawning grounds from two to five return several years later, and that of these from one to four may be taken without impairing the fishery. These are highly probable extremes, and the present rate of reproductive increase is between the two.

In the minor fisheries of Alaska cod were taken to the value of $118,821 and halibut worth $195,529. There were employed in these fisheries fixed capital to the value of $503,837 and 548 persons. In addition there is a fleet of vessels from California and Washington fishing in Alaskan waters, the data for which are not included in the above.

The Bureau is making an effort to stop the use of food fishes for fertilizer and to stimulate the utilization of scraps and waste fishes for that purpose. This is not only in the interest of economy of consumption, but to prevent the pollution of waters through the discharge of putrescent wastes. It therefore recommends the enactment of laws prohibiting the manufacture of fertilizer from food fishes and the extension of the antipollution act of March 3, 1899, in such manner as to protect the fisheries of Alaska.

Suitable vessels for the use of the salmon-inspection service are urgently required, and provision should be made by law for the regulation and limitation of the future establishment of plants for utilizing salmon.

Attention is again called to the fact that the personnel of the Alaska salmon service is entirely inadequate to a proper enforcement of the laws and regulations and the carrying on of investigations essential to a proper and intelligent administration of these important fisheries. Several additional scientific assistants are urgently needed in this service.

ALASKA FUR-SEAL SERVICE.

By an act of Congress approved April 21, 1910, that portion of the previous law requiring the Secretary of Commerce and Labor to lease the privilege of killing seals on the Pribilof Islands was repealed, and as the lease of the North American Commercial Company expired by limitation on April 30, 1910, the Bureau, under the direction of the Secretary of Commerce and Labor, assumed the entire administration of the islands, including the functions and obligations previously imposed on the lessees. The present duties of the Bureau on the islands therefore embrace all matters whatsoever relating to the seal herd and the care, education, and welfare of the native population.

Owing to the abuses connected with pelagic sealing mentioned in the preceding report of the Bureau, the condition of the seal herd is more precarious than at any previous period of its known history, and the utmost care must be exercised to save it from commercial extinction. In anticipation of the expiration of the lease recently in force and in view of the advisability of a change in the methods of administering the islands, the Bureau called a meeting of the advisory board mentioned in the last report, which, together with the employees of the Bureau, embraces practically all of the available naturalists and officials whose experience on the islands qualifies them to pass in judgment upon the present requirements of the seal herd. The Bureau has based its policy in respect to the islands upon the unanimous advice and recommendations of the parties to this conference.

The preponderance of the pelagic kill on the high seas, which is beyond the Bureau's control, consists of mature cow seals, and for reasons that are recognized by those having knowledge of the habits of the fur seal the killing of a limited number of the excess of immature males has been deemed advisable. No definite quota has been fixed, but the number is to be determined by the agents on the islands governed by certain rigid limitations as to age, sex, size, and the minimum number to be reserved for future breeding. The breeding reserve is to be selected, as far as possible, from the most vigorous and perfect individuals, with a view to the gradual improvement of the herd.

Under the provisions of the act of April 21, 1910, the Secretary of Commerce and Labor is charged with all matters pertaining to the care and preservation of all the fur-bearing animals of Alaska. Under this authority the Bureau has drawn regulations relating to the killing or capture in Alaska of certain fur-bearing animals other than seals, and said regulations, having been signed and promulgated by the Secretary of Commerce and Labor, are now effective in the Territory.

For the purpose of putting into effect the provisions of the act above referred to, the sum of $150,000 was appropriated. The immediately necessary additional employees required by the enlargement of the Bureau's functions on the islands have been appointed. The Bureau, under authority of the law and by direction of the Secretary of Commerce and Labor, has entered into negotiations for the purchase of the buildings, boats, and other property of the North American Commercial Company on the islands. The company has placed an apparently reasonable valuation on its property, and the proposition is under consideration subject to the results of an inventory now being made by an agent of the Bureau on the islands.

The data relating to the killing and the condition of the seal herds to July 31, 1909, were published in the preceding report of the Bureau. Those for the season of 1910 are not available at the time of writing the present report, and in any event are more strictly germane to the succeeding fiscal year.

THE FISHERY INDUSTRIES.

STATISTICS AND METHODS OF THE FISHERIES.

The commercial fisheries of the United States, including the various fishery industries dependent upon them, represent an investment of about $95,000,000, and the value of the products derived from the fisheries proper is about $62,000,000. With the exception of the mackerel and some other fisheries that for a number of years have not been as extensive as formerly, all of the more important branches of the industry are in a prosperous condition. The catch of mackerel during the past year was smaller than in the previous year, amounting to 46,439 barrels fresh and 17,542 barrels salted in 1909, against 57,566 barrels fresh and 21,267 barrels salted in 1908. The spring fishery in 1910 was poorer than for a number of years past, the catch up to July 1 being only 16,410 barrels of fresh mackerel and only 2,490 barrels of salted mackerel. It was an exceptionally unfavorable season for the seiners, as they took only about 2,200 barrels of the total catch of fresh mackerel, the remainder being caught by the gill-net fishermen. The fish were larger than usual, many of them weighing from 3 to 4 pounds each, but the greater portion from 2 to 3 pounds each. The fleet numbered about 50 seiners and 125 netters.

Prices were good and some of the netters made large stocks. The first mackerel of the season were landed on April 8, at Fort Monroe, Va., the fare consisting of 1,200 fish weighing 2½ pounds each. The seiners reported seeing a good body of fish off the southern coast, but they were wild and could not be caught with seines. Of the fresh mackerel landed, 1,000 barrels were caught on Nantucket Shoals and the remainder mostly off the coast of New Jersey and in the vicinity of Block Island. The salted mackerel were all from the Cape Shore, and were all large fish. The light catch so far during the season on the Cape Shore is attributed to the fact that the fish passed along the coast far offshore outside of the fleet.

The investigation of the fisheries of the Philippine Islands was completed before the close of the year, and the statistics and other information relating to the commercial fisheries are being compiled.

A canvass of the salmon fisheries of the Pacific coast has also been made and the returns will be published at an early date.

In the spring of 1910 a beginning was made in the collection of comprehensive statistics of the oyster fishery. This is the greatest single national fishery in the world, and of itself yields a more valuable product than that derived from the entire fisheries of many important maritime countries. The work is demanded in the interests of the trade and for enlightened legislative regulation of the fishery. A canvass of the shad fisheries of the South Atlantic States was begun at the same time, and both inquiries were in progress at the close of the year.

The usual information was collected by the local agents at Boston and Gloucester, Mass., as to the quantity and value of fishery products landed at those ports by American fishing vessels during the year. The investigation of the movements of mackerel was concluded, and an inquiry was made regarding the condition of the shad and alewife fisheries of Chesapeake Bay and tributaries, and the fisheries of Mississippi.

The statistics collected by the local agents at Boston and Gloucester, Mass., of the extensive vessel fisheries at those ports have been published as monthly bulletins and distributed to the trade in various parts of the country, and also as annual bulletins giving the quantity and value of fishery products landed by American fishing vessels by months and by fishing grounds for the calendar year. The number of trips landed at these ports in 1909 was 6,306, aggregating 173,102,224 pounds of fish, valued at $4,616,444. Compared with the previous year the receipts have decreased 8,363,023 pounds in quantity and $12,981 in value. There was a decrease in the catch of cusk, hake, and mackerel, but an increase in that of cod, pollock, and halibut. The statistics are given in detail on the following pages.

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING 1909, BY MONTHS.

Month.	No. of trips.	Cod.				Cusk.				Haddock.			
		Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
		Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
LANDED AT BOSTON.													
January	287	1,211,700	$31,170			121,900	$2,265			3,394,600	$84,561		
February	366	1,373,600	50,569			166,700	3,766			4,801,100	127,821		
March	527	2,408,300	70,673			165,700	2,749			5,210,500	132,470		
April	518	1,689,700	47,942			289,000	4,288			4,043,800	91,698		
May	357	1,984,400	44,892			310,000	3,609			1,715,600	44,588		
June	305	2,696,800	75,588			90,500	1,398			2,284,100	45,460		
July	397	3,082,600	76,982			67,500	1,143			2,388,200	42,791		
August	362	2,931,800	75,275			43,700	769			2,660,800	68,714		
September	330	2,843,800	76,922			144,500	2,573			3,800,450	66,096		
October	464	2,440,900	79,378			195,000	2,941			3,584,600	96,513		
November	475	1,931,850	62,177			134,700	2,038			2,295,100	80,795		
December	410	1,245,250	50,010			233,500	3,982			2,306,400	85,237		
Total	4,798	25,840,700	741,578			1,962,700	31,521			38,485,250	966,744		
LANDED AT GLOUCESTER.													
January	77	357,373	5,982	247,641	$9,137	30,395	478	1,950	$49	327,680	6,120	6,957	$104
February	43	151,311	3,464	78,212	2,695	53,170	850	2,510	63	571,686	11,626	2,537	30
March	76	782,729	13,131	199,327	6,823	21,510	327	1,554	39	553,864	8,342	4,885	49
April	65	383,267	5,827	149,980	4,970	245,390	3,682	1,525	36	624,560	3,748	925	9
May	121	164,685	2,461	915,051	27,800	185,236	2,779	3,657	86	19,460	118	29,435	295
June	202	783,790	17,569	3,685,317	104,748	131,585	1,973	22,915	572	159,073	955	84,484	845
July	202	1,128,505	20,020	4,405,725	132,929	227,736	3,611	47,600	1,194	468,668	2,810	114,019	1,142
August	143	1,727,503	29,753	5,388,393	168,699	86,743	1,413	22,143	554	203,350	1,320	75,926	760
September	147	3,117,323	50,052	5,803,660	179,781	83,990	1,348	39,467	988	227,540	2,078	47,919	478
October	153	2,781,693	42,899	5,782,798	177,431	29,942	479	15,112	379	284,185	4,273	41,668	418
November	197	1,284,533	20,040	5,119,912	156,920	78,359	1,258	19,217	480	172,815	5,348	11,633	116
December	82	86,719	2,371	968,356	31,720	11,182	172	7,885	197	302,635	9,537	4,215	43
Total	1,508	12,749,431	213,569	32,744,372	1,003,653	1,185,238	18,370	185,535	4,637	3,915,516	56,275	424,603	4,289
Grand total	6,306	38,590,131	955,147	32,744,372	1,003,653	3,147,938	49,891	185,535	4,637	42,400,766	1,023,019	424,603	4,289
Grounds E. of 66° W. long.	752	10,555,761	189,694	28,586,245	866,533	532,702	8,770	79,908	2,000	5,055,621	115,054	238,175	2,404
Grounds W. of 66° W. long.	5,554	28,034,370	765,453	4,158,127	137,120	2,615,236	41,121	105,627	2,637	37,345,145	907,965	186,428	1,885
Landed at Boston in 1908	4,542	28,329,200	791,821			1,609,100	32,204			39,814,500	1,027,866		
Landed at Gloucester in 1908	2,067	13,286,077	250,862	21,832,454	762,801	3,457,399	56,522	140,772	3,531	7,603,365	89,466	640,507	9,729

Month.	Hake.				Pollock.				Halibut.			
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
	Pounds.	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
LANDED AT BOSTON.												
January	376,000	$7,611			183,700	$4,450			69,500	$7,220		
February	362,100	13,181			172,600	6,183			74,200	6,435		
March	393,500	10,300			264,000	7,933			180,200	12,899		
April	508,100	10,620			273,200	4,926			117,300	7,976		
May	1,049,800	13,755			276,900	3,770			163,300	11,325		
June	875,400	9,013			293,600	3,379			215,900	11,988		
July	777,600	10,854			663,000	8,293			141,900	9,222		
August	715,100	12,028			821,500	13,252			27,800	2,280		
September	1,076,700	15,936			845,300	14,495			138,100	12,597		
October	2,536,900	28,967			1,767,700	16,926			21,650	2,887		
November	1,965,900	26,343			1,402,950	14,511			40,400	4,577		
December	832,300	23,445			1,004,400	20,633			14,700	2,772		
Total	11,469,400	182,053			7,968,850	118,751			1,204,950	92,178		
LANDED AT GLOUCESTER.												
January	10,585	89	4,747	$72	22,820	196	43,860	$659	158,316	15,798	4,685	$328
February	19,448	223	625	8	11,820	168	8,726	106	246,827	24,545	510	36
March	1,190	9	820	10	12,546	117	3,882	39	306,329	24,724	5,115	345
April	49,836	300	6,910	69	45,028	317	3,592	36	395,156	26,161	9,759	652
May	299,267	1,796	665	7	1,125,580	7,426	69,570	696	412,121	20,304		
June	359,649	2,158	5,760	58	933,193	5,598	116,755	1,169	261,205	14,462	21,301	1,067
July	314,998	1,892	10,305	113	344,258	2,069	484,614	6,342	248,464	16,652	34,436	1,921
August	60,432	392	10,282	103	58,504	351	147,941	1,478	135,807	11,098	22,159	1,326
September	72,425	511	38,594	386	102,070	844	154,039	1,537	72,799	6,735	575,421	45,887
October	272,656	2,151	7,026	71	355,047	2,061	155,166	1,552	62,448	7,366	175,715	14,066
November	218,348	1,967	24,605	246	1,459,862	8,088	96,955	971	59,549	6,932	9,394	713
December	15,007	277	2,985	30	63,013	1,077	95,545	956	24,664	3,051	1,618	130
Total	1,693,841	11,765	113,324	1,173	4,533,741	28,312	1,380,645	15,541	2,383,685	177,828	860,113	66,471
Grand total	13,163,241	193,818	113,324	1,173	12,502,591	147,063	1,380,645	15,541	3,588,635	270,006	860,113	66,471
Grounds E. of 66° W. long	456,978	7,415	88,148	921	147,182	1,951	1,006,776	11,736	3,169,944	231,476	855,653	66,163
Grounds W. of 66° W. long	12,706,263	186,403	25,176	252	12,355,409	145,112	373,869	3,805	418,691	38,530	4,460	308
Landed at Boston in 1908	12,466,100	214,780			6,286,800	87,568			303,450	26,677		
Landed at Gloucester in 1908	7,968,350	64,522	122,442	1,833	6,141,926	47,600	1,090,205	16,364	2,875,802	205,957	946,558	66,263

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING 1909, BY MONTHS—Continued.

Month.	Mackerel.				Other fish.[a]				Total.				Grand total.	
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.			
	Pounds.	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
LANDED AT BOSTON.														
January									5,357,400	$137,277			5,357,400	$137,277
February									6,950,300	207,955			6,950,300	207,955
March									8,622,200	237,024			8,622,200	237,024
April									6,921,100	167,450			6,921,100	167,450
May									5,500,000	121,939			5,500,000	121,939
June	1,574,650	$97,806	253,900	$12,751					8,030,950	244,632	253,900	$12,751	8,284,850	257,383
July	1,437,400	65,837	161,800	6,607	938,800	$80,938			9,497,000	296,060	161,800	6,607	9,658,800	302,667
August	509,250	33,183	54,400	4,706	580,000	62,325			8,289,950	267,826	54,400	4,706	8,344,350	272,532
September			20,800	1,336	101,600	13,397			8,953,450	202,016	20,800	1,336	8,974,250	203,352
October					7,400	1,161			10,554,150	228,773			10,554,150	228,773
November					800	96			7,771,700	190,537			7,771,700	190,537
December									5,636,550	186,079			5,636,550	186,079
Total	3,521,300	196,826	490,900	25,400	1,631,600	157,917			92,084,750	2,487,568	490,900	25,400	92,575,650	2,512,968
LANDED AT GLOUCESTER.														
January					4,027,250	103,453	1,245,344	$24,389	4,934,419	132,116	1,555,184	34,738	6,489,603	166,854
February									1,054,262	40,876	93,120	2,938	1,147,382	43,814
March									1,678,168	46,650	215,583	7,305	1,893,751	53,955
April									1,743,237	40,035	172,691	5,772	1,915,928	45,807
May							853,800	17,076	2,206,349	34,884	1,872,178	45,960	4,078,527	80,844
June	202,680	7,391	2,051,400	105,439	193,800	1,781			3,024,975	51,887	5,987,932	213,898	9,012,907	265,785
July	311,400	15,040	149,800	7,198	344,322	1,924			3,388,351	64,018	5,246,499	150,839	8,634,850	214,857
August	76,320	3,852	337,600	29,519	154,650	986	27,000	574	2,503,309	49,165	6,031,444	203,013	8,534,753	252,178
September	9,360	828	50,000	3,041	389,050	2,035	8,000	160	4,074,557	64,431	6,717,100	232,258	10,791,657	296,689
October			144,200	15,678			53,000	949	3,785,971	59,229	6,374,685	210,544	10,160,656	269,773
November			234,000	25,876	1,034	124	1,153,520	20,872	3,274,500	43,757	6,669,236	206,194	9,943,736	249,951
December					375,000	12,000	5,964,000	101,408	878,220	28,485	7,044,604	134,484	7,922,824	162,969
Total	599,760	27,111	2,967,000	186,751	5,485,106	122,303	9,304,664	165,428	32,546,318	655,533	47,980,256	1,447,943	80,526,574	2,103,476
Grand total	4,121,060	223,937	3,457,900	212,151	7,116,706	280,220	9,304,664	165,428	124,631,068	3,143,101	48,471,156	1,473,343	173,102,224	4,616,444
Grounds E. of 66° W. long	1,660,060	91,230	2,663,500	156,901	4,331,886	115,379	9,191,864	163,373	25,910,134	760,969	42,710,269	1,270,031	68,620,403	2,031,000
Grounds W. of 66° W. long	2,461,000	132,707	794,400	55,250	2,784,820	164,841	112,800	2,055	98,720,934	2,382,132	5,760,887	203,312	104,481,821	2,585,444
Landed at Boston in 1908	4,422,310	233,125	266,600	17,099	1,481,620	120,270	680,000	13,600	94,713,080	2,534,311	946,600	30,699	95,659,680	2,565,010
Landed at Gloucester in 1908	1,085,510	75,469	3,200,600	158,416	7,464,804	131,078	7,948,796	124,002	49,883,233	921,476	35,922,334	1,142,939	85,805,567	2,064,415

[a] Includes herring from Newfoundland (4,296,250 pounds frozen, $113,535, and 9,029,756 pounds salted, $160,529).

More than 60 per cent of the quantity and nearly the same proportion of the value of the fishery products landed at Boston and Gloucester by the American fishing fleet during the year were caught on fishing grounds lying off the coast of the United States. A little over 28 per cent of the catch was from banks off the coast of the Canadian Provinces and 11.25 per cent from grounds off the coast of Newfoundland. The Newfoundland herring fishery furnished less than 8 per cent of the fishery products landed at these ports. The quantity and value of the catch from each of these fishing regions are given by species in the following table:

QUANTITY AND VALUE OF FISH LANDED BY AMERICAN FISHING VESSELS AT BOSTON AND GLOUCESTER, MASS., IN 1909, FROM GROUNDS OFF THE COASTS OF THE UNITED STATES, NEWFOUNDLAND, AND CANADIAN PROVINCES.

Species.	United States.		Newfoundland.		Canadian Provinces.		Total.	
	Pounds.	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
Cod:								
Fresh	28,031,010	$765,402	88,810	$1,492	10,470,311	$188,253	38,590,131	$955,147
Salted	4,158,127	137,120	3,828,665	113,087	24,757,580	753,446	32,744,372	1,003,653
Cusk:								
Fresh	2,608,626	41,022	7,660	123	531,652	8,746	3,147,938	49,891
Salted	105,627	2,637	7,690	191	72,218	1,809	185,535	4,637
Haddock:								
Fresh	37,345,145	907,965			5,055,621	115,054	42,400,766	1,023,019
Salted	186,428	1,885	11,235	113	226,940	2,291	424,603	4,289
Hake:								
Fresh	12,668,503	186,176	11,278	70	483,460	7,572	13,163,241	193,818
Salted	25,176	252	10,947	132	77,201	789	113,324	1,173
Pollock:								
Fresh	12,355,229	145,111	100	1	147,262	1,951	12,502,591	147,063
Salted	373,869	3,805	36,620	367	970,156	11,369	1,380,645	15,541
Halibut:								
Fresh	418,691	38,530	1,349,221	94,603	1,820,723	136,873	3,588,635	270,006
Salted	4,460	308	803,489	63,004	52,164	3,159	860,113	66,471
Mackerel:								
Fresh	2,461,000	132,707			1,660,060	91,230	4,121,060	223,937
Salted	794,400	55,250			2,663,500	156,901	3,457,900	212,151
Herring:								
Fresh	99,600	1,651	4,296,250	113,535	25,000	500	4,420,850	115,686
Salted	85,800	1,481	9,029,756	160,529	162,108	2,844	9,277,664	164,854
Swordfish:								
Fresh	1,626,520	157,185	394	47	10,242	1,297	1,637,156	158,529
Other fish:								
Fresh	1,058,700	6,005					1,058,700	6,005
Salted	27,000	574					27,000	574
Total	104,433,911	2,585,066	19,482,115	547,294	49,186,198	1,484,084	173,102,224	4,616,444

SHAD AND ALEWIFE FISHERIES.

The canvass relating to the methods, apparatus, extent, and condition of the shad and alewife fisheries of Chesapeake Bay and tributaries, which was begun in the spring of 1909, was completed before the close of that year, the work being done by the steamer *Fish Hawk* and field agents. The fishing apparatus used in the capture of shad and alewives was located on charts, and statistics of the catch for the season of 1909 were obtained. The fishing apparatus included 3,332 pound nets, 12,768 gill nets, and a considerable number of seines, fyke nets, and other appliances. The catch consisted of 2,924,018 shad, having a value to the fishermen of $785,739, and 128,618,249 alewives, with a value of $284,039. The shad were sold

fresh, and the alewives were disposed of in both a fresh and salted condition, the number salted being 16,827,000, valued at $74,419. The shad catch has declined nearly 50 per cent in quantity since 1897, the number of shad taken that year in the Chesapeake and tributaries being 5,341,751. In 1901 the number had decreased to 3,000,544, and in 1904 to 2,950,492. A still further decrease of 26,474 occurred in the past year. This large falling off during these years is obviously due to overfishing and to the fact that the large number of pound nets and other apparatus operated prevent the anadromous species from reaching their spawning grounds, thus seriously interfering with both natural and artificial propagation. In Virginia in 1909 there were fished in these waters for shad and alewives 2,043 pound nets and 7,121 gill nets, and in Maryland 1,289 pound nets and 5,620 gill nets, the remainder of the gill nets being in Pennsylvania and Delaware. The catch apportioned by States in 1909 was as follows:

State.	Shad.		Alewives.	
	Number.	*Value.*	*Number.*	*Value.*
Virginia	1,855,446	$488,336	69,469,949	$128,375
Maryland	1,000,827	272,869	59,093,300	155,499
Pennsylvania	60,045	22,224	25,000	75
Delaware	7,700	2,310	30,000	90
Total	2,924,018	785,739	128,618,249	284,039

INVESTIGATION OF THE MACKEREL FISHERY.

The mackerel investigation, which was begun in April, 1909, at the request of the Board of Trade and Master Mariners' Association of Gloucester, Mass., representing many of the firms and vessel owners interested in the mackerel fishery, was concluded in October of that year, occupying a period of about six months. The schooner *Grampus* was detailed for the work, and Capt. Jerry E. Cook, an experienced mackerel fisherman of Gloucester, was in charge of the inquiry. The vessel was equipped with gill nets and lines for locating the fish and with tow nets for use in detecting the presence of the minute crustaceans which form the principal food of the mackerel. The object of the inquiry was chiefly to determine the movements of the mackerel, which usually make their first appearance on the American coast in the spring off Cape Hatteras and gradually move northward to the Gulf of St. Lawrence, to locate any bodies of mackerel that may frequent grounds remote from those cruised over by the fishermen, and also to assist the mackerel fishermen by furnishing them with information as to the schools of mackerel seen and their location and movements.

It is thought by some fishermen that the introduction of purse seines and gill nets in the fishery, replacing hooks and lines and a

plentiful supply of toll bait, has had a tendency to disperse the schools of mackerel and is partly responsible for the prevailing scarcity of that species during the past twenty or more years. This opinion, however, has not become sufficiently strong or general to lead to any concerted action on the part of the vessel owners with a view to abandoning the use of these forms of apparatus in the mackerel fishery and returning to the former methods.

The *Grampus* sailed from Gloucester April 7 and proceeded southward to Lewes, Del., where she joined the seining fleet. On May 2 the vessel sailed from that port to begin the work of investigating the movements of the mackerel. The first experiments were made on that date in latitude 38° N. and longitude 74° 21′ W. The work was continued along the coast from this locality to Georges Bank until the 1st of August, but chiefly on the southern grounds in order to ascertain whether the mackerel remain there after making their first appearance early in the spring or move northward. The fish were not located there, however, after the early run in the spring, nor were any of the usual signs of them, such as sea geese, red feed, whales, etc., observed. The vessel worked over Georges Bank and continued eastward over Browns Bank, and on August 5 anchored at Sandy Point, Shelbourne, Nova Scotia. She sailed from there on the 8th of August, and from Halifax on the 12th, reaching North Sydney, Cape Breton, on the 15th. For the remainder of August and during September the work was pursued in the Gulf of St. Lawrence and on the southerly part of the coast of Newfoundland. The *Grampus* left the Gulf of St. Lawrence early in October and arrived at Gloucester on the 16th of that month. At all times during the cruise a masthead lookout for mackerel was kept day and night when the weather was favorable for observation, and net trials for locating the fish were made at every opportunity.

During the first part of the trip the work was frequently interrupted by stormy weather, which also at times greatly interfered with the operations of the seining fleet. The mackerel were late in showing, and were unusually far offshore. Investigation showed that the latter condition was caused by the appearance of great schools of bonito, which came up the coast over the usual mackerel route and kept the schools of mackerel well offshore, and later, when the mackerel approached their regular course, caused them not to show, but to move along under water. This was indicated by the many large hauls made by the vessels of the mackerel netting fleet, which did unusually well, while the purse-seine fishermen, depending on the mackerel to school and show, had a poor season as a whole. There was a good catch on the Nova Scotia coast, or Cape Shore, and the vessels did well for a time on Nantucket Shoals, but otherwise the season was practically a failure. A few hauls were made on the southern edge

of Georges Bank, but the fish stayed there only a short time, disappearing as suddenly as they came. In Massachusetts Bay and on the Maine coast there was practically no mackerel fishing, a few small schools taken off Monhegan being all that showed on the latter shore. The season in the Gulf of St. Lawrence was also a poor one, the catch of the 22 American purse-seining vessels that went there being only 1,785 barrels. No fish were found schooling, and the catches made were secured by throwing toll bait and using line and jig, the seine being run around the vessel while the fish were attracted by the bait. Bad weather set in early and fishing off North Sydney was discontinued before the usual time.

The cruise did not result in ascertaining where the southern body of mackerel goes after coming as far north as Long Island nor in locating the great body of mackerel which goes into the Gulf of St. Lawrence, but that large schools entered the Gulf of St. Lawrence in June and, some of them at least, came out in the fall and went south is indicated by the fact that large catches were made off Halifax and La Have and westward as far as Cape Sable, and that great schools were reported off Halifax and other Cape Shore ports late in the season. It is evident from the experiments and observations made during the cruise that the food supply and spawning habits of the mackerel are not the only factors to be considered in the study of their migrations, but that the weather conditions and the presence of bonito and other predatory species have a decided influence on their movements. A plentiful supply of food was frequently found in localities where there were either no mackerel or only scattering individuals.

The *Grampus* kept in as close touch with the seining fleet as was consistent with the work, and furnished the vessels with all information obtained regarding the schools of mackerel seen.

Considerable information was also obtained during the cruise regarding the movements of menhaden. These fish were reported by the mackerel seiners early in April about 25 miles off Bodie Island, North Carolina, in 45 fathoms of water. They were in large schools and appeared to be working northward and keeping well offshore. About the 20th of the month large schools were observed in 36° 30′ north latitude and extending a distance of about 90 miles. A number of menhaden were taken in the mackerel seines about this time, and were large and moderately fat fish. During April large schools of bonito were seen some distance inshore of the menhaden, which was apparently the reason why the latter remained so far offshore. One vessel reported sailing 25 miles with bonito constantly in sight, moving rapidly and at times breaking water, probably in pursuit of some small feed other than menhaden. No schools of bonito were seen north of the Virginia capes, and the menhaden appeared on the coast of New Jersey early in May after the bonito disappeared.

FISHERIES OF MISSISSIPPI.

At the request of citizens of Biloxi, Miss., through their Representative in Congress, an investigation was made of the condition of the fisheries at that place, and incidentally of the coast fisheries of the entire State, not including oysters.

The fisheries of Mississippi are chiefly carried on at Biloxi and Scranton, the former place having about 250 vessels and boats and the latter about 50 engaged in this industry. The principal species taken are shrimp (which ranks first in importance), bluefish, Spanish mackerel, pompano, mullet, flounders, trout or squeteague, and crabs. In former years the supply was generally equal to the demand, but in the last three or four years it is claimed by fishermen and others interested in the fisheries that there has been considerable falling off in the annual catch of most species, on account of overfishing.

While the coast fisheries of Mississippi are not as extensive as those of some other States, they are of great value to the State and should receive as careful attention in the way of protection as other States give to their fisheries. Many fishermen and dealers at Biloxi are of the opinion that artificial propagation is the only means by which the more important commercial species can be saved from extermination, but a judicious enforcement of laws that should be enacted to prevent the wholesale capture of fish during the spawning season, and making it a penal offense to capture fish by the use of dynamite, lime, or other explosives in rivers, lakes, bayous, or along the coast, would have a tendency to restore the fisheries to their former prosperous condition. This course of action would no doubt produce beneficial results in a comparatively short time. The first requisite in the present circumstances seems to be to take the necessary steps to save certain species by natural rather than by artificial means. The establishment of a state fish commission, with authority to recommend and enforce fishery legislation, would also be of great assistance in protecting and maintaining the fisheries. Without such an organization the fisheries are destined to decline more rapidly in the future than they have in the past.

The principal forms of fishing apparatus used in the fisheries of the State are drag seines, gill nets, and trammel nets. There is also a considerable quantity of fish taken with cast nets. In no part of the country is this apparatus used with greater skill than in this region, and according to some of the fishermen its extensive use is responsible for the great scarcity of crappie, black bass, and pike. When the water in the rivers and bays is low, many species of fish take refuge in pools and deep holes and are easily captured.

In Red and Black creeks it is said that fish were once abundant, but in recent years the use of dynamite has nearly exterminated them. According to reports, this method is not only employed by commer-

cial fishermen but also by people who wish to supply their own table. Jugs filled with lime and lowered to the bottom are also the means of destroying large quantities of fish. The water coming in contact with the lime causes the jugs to burst, scattering the lime, which either kills the fish or causes them to rise to the surface in a dazed condition, making their capture easy.

At Biloxi the harbor for vessels is at Back Bay. Six or seven years ago considerable fishing was carried on from 2 to 3 miles above the anchorage, toward the head of the bay. At the present time very few fish are taken in this vicinity. At times during a freshet buffalo-fish are caught in considerable quantities near the mouth of the bay. At other times this species is generally observed up the bay some 6 or 8 miles above Popps Point, where commercial fishing is prohibited. During a heavy freshet it is said that the current runs 15 miles an hour.

In the upper part of the bay there are numerous small islands covered with tule grass; these islands afford excellent seining grounds. In the channels formed by the islands fishing is carried on with trammel nets. There are many snags in the channels, which prevent the use of drag seines.

Shrimp were quite scarce in 1909, but in the spring of 1910 they were plentiful, and the usual pack was made. It is estimated that in the vicinity of Gulfport and Biloxi 6,000 barrels of shrimp were caught during the season. It is stated that only about one-half the quantity of shrimp is now taken as compared to the catch ten years ago, although nearly double the number of men and boats is employed. In the last few years, however, there has been considerable increase in the catch, owing to an extension of the fishing grounds. Vessels now fish for shrimp 30 miles east and west of Biloxi and from 75 to 100 miles south.

Shrimp arrive from the south in the latter part of February and remain on the coast until May. In the latter part of July or the first of August a school of mixed sizes of shrimp appear, and in September another school of marketable shrimp strikes the coast.

In 1909, 14,000 pounds of mullet were taken in one haul of a seine and all were said to be spawn fish. Many fishermen are of the opinion that such wholesale slaughter of spawn fish should be stopped.

Redfish or channel bass, trout or squeteague, and sheepshead have not decreased as rapidly as some other species, being taken in deep water, and principally with hook and line.

The shipping facilities and method of handling fish at Biloxi compare favorably with those in other parts of the country. On account of the scarcity of many shore species, attention is being directed to the red-snapper fishery. To engage in this fishery would require deeper draft vessels and the building of plants for handling fish on the outlying islands, where vessels arriving from the banks could

land their fares and tranship them in scows or other shallow boats to Biloxi. In this manner the red-snapper fishery might be established and successfully prosecuted.

MISCELLANEOUS ACTIVITIES.

RELATIONS WITH OTHER GOVERNMENT BUREAUS.

During the year the Bureau has cooperated with other branches of the Government, both giving and receiving assistance in the interests of an economical and efficient administration of the public business. The assistance rendered to the Bureau of the Census in the statistical canvass of the fisheries in the preceding fiscal year was supplemented by the detail of an agent of the Bureau to aid in certain technical matters connected with the compilation of the data. This assistance consisted principally in the identification and consideration of the involved and often dubious nomenclature of the fishes exhibited in the field schedules.

A large number of samples of fishery products have been identified and passed on at the request of the food and drug board of the Department of Agriculture, and other assistance has been rendered in connection with the functions of that board.

In March, 1910, on request of the Secretary of War preferred through the Department, an examination and appraisal was made of certain oyster bottoms adjoining the military reservation at Fort Monroe, Va., recently ceded by the State of Virginia to the Federal Government. A full report, accompanied by tracings, was transmitted to the War Department.

The Bureau expresses its appreciation of the services of the Bureau of Chemistry of the Department of Agriculture for analyses of water from various hatcheries and to the Coast and Geodetic Survey for various charts and projections and for other courtesies extended.

INTERNATIONAL FISHERY MATTERS.

In 1909, as in the four previous years, at the request of the Department of State, the Bureau detailed a representative to visit Newfoundland for the purpose of observing the operations of American fishing vessels engaged in the herring fisheries there under the provisions of the modus vivendi. The detail extended from October, 1909, to January, 1910. No vessel was assigned to the work this year. In June, 1910, two representatives from the Bureau's official staff were detailed to The Hague to assist the American counsel in the case before that tribunal for a settlement of the dispute as to the rights of our fishermen in Newfoundland and Canadian waters under the treaty of 1818.

The Bureau continued its cooperation with the State Department, through the International Fisheries Commission, in securing basic

data for the regulations required by the treaty between the United States and Great Britain, signed April 11, 1908, which provides for the joint control by the United States and Canada of the fisheries in the waters contiguous to the boundary between the two countries. Field work was conducted in Passamaquoddy Bay and eastern Maine and on Lake Erie and Lake Huron.

There is every reason to believe that both of these international questions, which have long been a source of irritation to the fishermen of the countries involved, will be satisfactorily adjusted during the present year.

EMPLOYMENT OF VESSELS.

The investigation concerning the aquatic resources of the Philippine Islands was continued by the steamer *Albatross* until February 12, when she went to Nagasaki for a general overhauling before undertaking the voyage to the United States. She arrived at San Francisco in excellent condition May 4, and was promptly made ready for immediate work in Alaskan waters. While the vessel underwent considerable repairs in Hongkong the year before, these were necessitated by work previous to the Philippine expedition and the fact that she returned to San Francisco in such good condition after a cruise beginning in 1907 reflects credit on the construction of the vessel and the care given by her commanding officers.

The steamer *Fish Hawk* was occupied from the beginning of the fiscal year until the middle of September in a comprehensive survey of the public oyster grounds of Virginia in the James River, and afterwards in collecting aquarium specimens. In October the ship went to Woods Hole, where her machinery was put in good order by the station force and the crew and the vessel made ready for further work. In the spring, shad hatching on the Delaware River was begun and continued until June, when a survey of the public oyster grounds of Delaware was commenced and at the close of the year was still in progress. Fuller references to the surveys mentioned are embodied elsewhere in this report.

The schooner *Grampus* was engaged in the mackerel investigation referred to elsewhere until October 10, 1909, her sphere of operations extending from Newport to Bay of Islands, Newfoundland, and the Gulf of St. Lawrence, and including the offshore fishing banks. During the late fall and winter the vessel was laid up and the crew utilized in connection with marine fish-cultural work on the New England coast until April, when she was made ready for sea and began the collection of lobster eggs and distribution of lobster fry for the hatchery at Boothbay Harbor, Me., and was so engaged the remainder of the year.

The smaller steamer *Phalarope* was used during the entire year in fish-cultural work on the New England coast and on the Potomac

River, and as a collecting vessel for the Woods Hole laboratory. The *Curlew* was employed on the Mississippi River, especially in collecting fishes from the overflowed lands.

PUBLICATIONS AND LIBRARY.

The collection of special books maintained by the Bureau for purposes of reference and technical investigation has received 260 accessions in Washington from gifts, purchases, and exchanges, and over 200 accessions at the laboratories and stations elsewhere. The intimate relations maintained with other libraries result in exchanges and transfers which are mutually profitable, and particularly advantageous to the Bureau in view of the limited funds available for the purchase of books and periodicals. The use of the library has been much facilitated by the progress made during the year on the systematic subject catalogue.

The continued interest of the public in the work of the Bureau is shown by the facts that during the year 2,916 bound volumes and 21,832 pamphlets of its publications were sent out on request, 45,890 were required for the regular mailing list, and 2,020 issued to authors. There were received from the Government Printing Office for distribution 87 new reports and bulletins published by the Bureau and 5 reprints of important documents the supply of which had been exhausted. The titles of the new issues (No. 646 to No. 732) may be found in the Bureau's list of publications available for distribution.

APPROPRIATIONS.

The total appropriations for the Bureau for the fiscal year amounted to $823,490, or $16,610 less than the aggregate for the previous year.

Salaries:	
General	$316,860
Agents at Alaska salmon fisheries	4,500
Agents at seal fisheries	11,430
Miscellaneous expenses:	
Administration	8,000
Propagation of food fishes	275,000
Inquiry respecting food fishes	30,000
Statistical inquiry	7,500
Maintenance of vessels	55,000
Supplies for native inhabitants, seal islands	19,500
Specials:	
Establishment of fish-cultural stations on Puget Sound or its tributaries	50,000
Establishment of a fish-cultural station in the upper Mississippi Valley	25,000
Purchase of a steamboat, Put-in-Bay, Ohio	15,000
Construction of roadway, Greenlake, Me	2,700
Repairs to buildings, Pribilof Islands	3,000

In addition to the above funds, the sum of $150,000 was appropriated and made immediately available for the purpose of carrying out the provisions of the act of April 21, 1910, which placed under the Secretary of Commerce and Labor the administration of the fur-seal islands and the preservation of the fur-bearing animals of Alaska.

An itemized statement of expenditures authorized by the foregoing appropriations will be made as required by law.

RECOMMENDATIONS.

REORGANIZATION OF PERSONNEL.

The foregoing report exhibits briefly the rapid growth of the activities and responsibilities of the Bureau by natural accretion to lines of work long established and by the addition of functions not contemplated when the present organization was adopted. The assignment of new duties to the Bureau has made it necessary to impose them upon persons whose time and attention were already fully taxed by the natural development of their previous responsibilities, and it therefore appears to be essential to the continued efficiency of the Bureau that there should be a reorganization of the personnel. The Alaska salmon service and the fur-seal service, now assigned to the Bureau, both involving executive and police functions of an exacting character, are administered by the Division of Scientific Inquiry, from which it is desirable that they be separated. The original requirements of the division are incompatible with the added functions, and their continued administration by one person can only be at the sacrifice of the efficiency of both. It is therefore recommended that the present organization be augmented by the creation of a new division to be known as the Division of Alaska Fisheries, with sufficient additions to the present force to make its work effective.

The United States has entered into certain treaty obligations in respect to the waters adjacent to the Canadian boundary, whereby it is proposed to assume international control of the fisheries in the interest of their conservation and development. Regulations making this agreement effective were submitted to the Senate but were returned to the joint commissioners for further consideration. It is assumed that they will be reduced to a satisfactory basis in the near future, in which event the Bureau will find itself charged with enforcing them. Should this be the case, since under the present organization there is no provision for the discharge of this duty, it will be necessary to provide a Division of International Fisheries.

SALARIES AND PERSONNEL.

The recommendations of the preceding fiscal year in reference to the increase of the salaries attached to certain positions in its service are renewed. Congress at its recent session increased the pay of low-

grade clerks, firemen, and messengers, but did not authorize any advance in the salaries of those on whose work the efficiency of the Bureau is more directly dependent. The experience of another year has made more apparent the desirability of making remuneration more commensurate with duties and responsibilities.

The Bureau is in constant receipt of requests from Members of Congress and state authorities for special investigations and experiments in the interests of the public fisheries, and in many cases prompt compliance with these legitimate demands is difficult or impossible, because the personnel has not kept pace with either the growth of the work or the increase of general appropriations. There are certain fisheries to which, on account of their peculiar requirements, it has not been possible to render the service which those engaged in them have the right to expect. To the oyster industry, for instance, which yields $16,000,000 annually, about 30 per cent of the value of the entire fisheries of the United States, the Bureau's assistance has been wholly inadequate. Proportionately to the value of the respective fisheries, sixty-five dollars are profitably expended in shad culture for every dollar spent for the benefit of the oyster industry. The inequality arises not from the inability to allot money from the appropriations, but to the lack of trained and experienced men. Fish-cultural methods can not be applied in oyster culture, and the only valuable aid which can be offered is through the medium of research and practical experiment, which experience has shown lead to profitable and lasting benefits from disproportionally small expenditures. For carrying on such work provision should be made for additional scientific assistants.

SPONGE LAW.

The act of June 20, 1906, to provide for the protection of the sponge fisheries of the United States on the high seas of the Gulf of Mexico and the Straits of Florida, has shown itself futile and impossible of enforcement. The purpose of this law was to prohibit the fishery by diving in depths of less than 50 feet, and during the period from May 1 to October 1 to prevent the taking, by whatever means, outside of the 3-mile limit, of sponges smaller than 4 inches in diameter.

The offenses aimed at are not specifically prohibited, but they were supposed to be prevented by the prohibition of certain subsidiary acts—the landing, curing, or offering for sale in the United States of sponges taken in contravention of the real purpose of the law. To secure a conviction it is therefore necessary to establish a connection between the act of taking under the objectionable circumstances and certain subsequent and secondary acts which per se are innocuous. A diving vessel operating during the close

season can not be interfered with until the sponges are landed, cured, or offered for sale in the United States. The sponges, therefore, must be followed or traced from their beds in the high seas to a point of territorial jurisdiction, a requirement that is usually impossible of enforcement.

Moreover, the law provided the Department with no machinery for its enforcement. It has been necessary to depend upon the courtesy of the Treasury Department for the personnel required, and no provision has been made for expenses.

In view of the circumstances narrated, and in the interest of the unimpaired maintenance of the sponge beds, it is recommended that the act of June 20, 1906, be amended to correct its defects and that the Bureau be provided with an inspector, a suitable boat, and funds for the proper enforcement of the law. It is further recommended that the minimum size of sponges which it shall be legitimate to take be established at 5 inches diameter, and if this be done that the close season be curtailed by not exceeding two months.

EXTENSION OF FISH CULTURE.

It is again urged that provision be made for the establishment of additional stations for the rescue of fishes from overflowed lands in the Mississippi Valley. Millions of fish now annually left by the receding waters to die of exposure can by this means be saved at small expense.

The Bureau is of the opinion that a highly important work of the near future will be the stocking of ponds and streams on the farms of the country with hardy species of fish requiring little care or attention and omnivorous as to diet. The several species of catfishes appear to fulfill the requirements more completely than any other fish. They will grow in sluggish and muddy water, they are very tenacious of life, their diet is of wide variety, and as food they are excelled by but few fresh-water fish. While some of the smaller species can be made important additions to the home food supplies of the farms, certain others, particularly the larger ones, are already the basis of important commercial fisheries. For the propagation of both kinds the establishment of a station at some point in the lower Mississippi Valley, preferably near Morgan City, La., is regarded as highly desirable.

The fish-cultural work in Yellowstone Park has been conducted heretofore with inadequate means as an adjunct to the operation of Spearfish Hatchery, but it is believed that the opportunities in the national park are such as to warrant an independent station. One of the chief difficulties encountered in the efforts to replenish the depleted fisheries of the United States arises from the lack of control

over the fishes after they are planted and the neglect of certain States to make provision for their protection. Yellowstone Park, being under federal jurisdiction, offers an exceptional opportunity to demonstrate the possibilities of fish culture under rational and consistent regulations.

The Bureau also recommends the establishment of one marine and one additional fresh-water hatchery on the Pacific coast, and an additional station in Texas for the supply of a demand for fish in the Southwest which it is at present impossible to satisfy.

LABORATORY FOR THE STUDY OF FISH DISEASES.

There is again urged the importance of a station for the study of fish diseases and experiments in the interests of fish culture. In some of the hatcheries of the Bureau and in similar establishments under state and private auspices certain fish diseases have become so prevalent as to make it a matter of grave consideration whether the propagation of certain species, especially the trouts, should not be abandoned. It frequently occurs that the fish and fry are decimated by epidemics for which there are no known remedies, in consequence of which there are annually entailed on fish culture large wastes of time and money. In addition to the financial loss, embarrassment arises at times in filling legitimate demands for fish for restocking depleted waters, and the effect on the morale of the employees of the Bureau who have to struggle hopelessly against an obscure disease is not unworthy of consideration. The gravest phase of the matter, however, is the possible relationship of some of these diseases to more or less kindred affections occurring in human beings. It has been determined that a type of cancerous affection is of widespread distribution among domesticated trout and their offspring planted in the streams. Whether this disease has a causal relation to cancer in human beings, or whether the two are to be even traced to the same source, is a matter of doubt, but the annually increasing mortality from cancer in man and certain remarkable coincidences in the geographical distribution of the disease in man and fish render it imperative that it should be made the subject of minute inquiry. The matter therefore has not only economic but humanitarian aspects, and the consideration of the serious character of the latter prompted the President to submit to Congress on April 9, 1910, a special message advocating an appropriation of $50,000 for the construction and equipment of a laboratory adequate to enable the Bureau to discharge its plain obligations. The Bureau in the meantime is proceeding in the investigation to the limit of its powers, but it may be stated emphatically that it can make but little progress without the special facilities asked for.

FISHERY INTELLIGENCE SERVICE.

For many years the Bureau has maintained at Boston and Gloucester, Mass., a service making current statistical reports on the fisheries of those ports. This service has the strong support of the commercial interests, and a proposition for its abandonment would result in instant and vigorous protest. The large fishery interests of the Pacific coast are becoming insistent in their requests that a similar service be inaugurated in that region, and the Bureau regards the work of such importance as to impel it to recommend provision for a suitable personnel for the purpose. In view of the regard in which the reports at Boston and Gloucester are held by the fishery interests, it would appear desirable to gradually extend the service to other places on the Atlantic and Gulf coasts having extensive vessel fisheries.

NEW BUILDING.

As has been repeatedly indicated in these reports, the quarters of the Bureau are antiquated, crowded, unsafe, and inadequate in every respect. They impede the transaction of the public business and interfere with efficiency and development. It is again earnestly recommended that provision be made for a building which will furnish offices, laboratories, workrooms, and an aquarium national in scope and in keeping with necessitous requirements.

Respectfully,

Geo. M. Bowers,
Commissioner.

To Hon. Charles Nagel,
Secretary of Commerce and Labor.

THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1910

Bureau of Fisheries Document No. 740

CONTENTS.

INDEX TO SPECIES.

THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1910.

CHARACTER OF THE WORK.

More than 95 per cent of the output of the fish-cultural stations consists of important commercial species, notably the salmons, shad, whitefish, pike perch, yellow perch, white perch, lake trout, cod, pollock, flatfish, and lobsters. These are hatched in lots of many millions annually and planted by the Bureau, the fresh-water species principally in the large coastal streams and in the Great Lakes, the marine species upon the inshore fishing grounds of the Atlantic.

The cultivation of the fishes of the interior waters generally classed as game fishes, although a comparatively small factor in the total output, is a very important feature of the Bureau's work, supplying as it does various kinds of young fish for public streams, lakes and ponds, fishing preserves, private ponds, streams, etc., in all parts of the United States. Among the fishes most extensively cultivated for these purposes are the landlocked salmon, several species of trout, the grayling, the basses, crappie, bream, and catfish; various others also are handled. The trouts are artificially hatched from eggs taken from both wild and domesticated stock; the basses, catfish, and others are derived from mature fish held in ponds for breeding purposes, or (except the small-mouth black bass) they are rescued from the overflows of the Mississippi and Illinois Rivers. Collections from the latter sources include also pike and pickerel, which are not distributed to applicants but are returned immediately to the main streams.

METHOD OF DISTRIBUTION.

The first consideration in the Bureau's distribution of fishes is to make ample return to the waters from which eggs or fish have been collected. The remainder of the product is consigned to suitable public or private waters upon application indorsed by a United States Senator or Representative, the Bureau furnishing to persons interested an application blank for this purpose. The blank calls for a description of the waters to be stocked, and by this information is determined the species of fish that is suitable and the number that may be allotted to the water area in question. Certain predaceous species, such as the basses, perches, and pickerel, are not furnished

for waters inhabited by trout or other valuable fishes to which they would be destructive. Nor, of course, are species like trout and salmon furnished for waters already stocked with fish that would prey upon them.

The fish are carried to their destination in railroad cars equipped for the purpose, or by messengers who accompany the shipments in baggage cars, and are delivered to the applicant free of charge, at the railroad station nearest the point of deposit. The applicant is advised by telegraph when the shipment will arrive, and is expected to make due provision for care of the fish until planted. Definite instructions in this respect are furnished at the time of shipment.

During the past fiscal year (July 1, 1909, to June 30, 1910) the Bureau received 10,635 applications for fish, nearly all for the game species. The demand, especially for the basses, crappie, and the catfishes, has for some time been greater than could be met with available resources. The number of applications this year was 523 more than in 1909.

SIZE OF FISH WHEN DISTRIBUTED.

Fishes are distributed at various stages of development, according to the species, the numbers in the hatcheries, and the facilities for rearing. The commercial fishes—such as the shad, whitefish, lake trout, pike perch, cod, etc., hatched in lots of many millions—are necessarily planted as fry shortly after hatching. Atlantic salmon, landlocked salmon, and various species of trout are reared, in such numbers as the hatchery facilities permit, to fingerlings from 1 to 6 inches in length; the remainder are distributed as fry.[a]

The basses, bream, and other sunfishes are distributed from some three weeks after they are hatched until they are several months of age. When the last lots are shipped the basses usually range from 4 to 6 inches and the sunfishes from 2 to 4 inches in length. The numerous fishes collected in overflowed lands—basses, crappie, sunfishes, catfishes, yellow perch, and others—are 2 to 6 inches in length when taken and distributed.

Eggs are distributed only to state hatcheries and, occasionally, to applicants who have hatchery facilities.

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[a] The varying usage in the classification of young fish as to size has caused such confusion and difficulty that the Bureau has adopted uniform definitions, as follows:

Fry=fish up to the time the yolk sac is absorbed and feeding begins.

Advanced fry=fish from the end of the fry period until they have reached a length of 1 inch.

Fingerlings=fish between the length of 1 inch and the yearling stage, the various sizes to be designated as follows: No. 1, a fish 1 inch in length and up to 2 inches; no. 2, a fish 2 inches in length and up to 3 inches; No. 3, a fish 3 inches in length and up to 4 inches, etc.

Yearlings=fish that are 1 year old, but less than 2 years old from the date of hatching; these may be designated No. 1, No. 2, No. 3, etc., after the plan prescribed for fingerlings.

SIZE OF ALLOTMENTS.

The Bureau does not attempt to furnish to any one applicant more than a brood stock of fish for a given private pond or stream, it being expected that these will be protected until they have had time to reproduce. The number of fish in an allotment is, however, a variable quantity, depending upon the species and the age at which distributed. Brook trout, which are distributed both as fry and fingerlings, are allotted in much larger numbers as fry than as fingerlings 3 or 4 inches long. Pike perch, which, owing to their excessive cannibalism, can not be reared and are consequently distributed as fry, may be supplied in lots of half a million, where an equal water area would receive only 200 or 300 young bass from 2 to 5 inches long. These latter larger fish have a much better chance of reaching maturity than have the fry, and the actual value for stocking purposes of a few hundred fingerling bass may therefore equal many thousand times this number of pike perch fry.

SPECIES CULTIVATED IN 1910.

The species cultivated by the Bureau in 1910 numbered some 50 fishes and the lobster. Of these the following were artificially propagated:

THE CATFISHES (SILURIDÆ):
- Horned pout, bullhead, yellow cat (*Amciurus nebulosus*).
- Marbled cat (*Amciurus nebulosus marmoratus*).

THE SHADS AND HERRINGS (CLUPEIDÆ):
- Shad (*Alosa sapidissima*).

THE SALMONS, TROUTS, WHITEFISHES, ETC. (SALMONIDÆ):
- Common whitefish (*Coregonus albus* and *C. clupeaformis*).
- Lake herring, cisco (*Leucichthys artedi*).
- Chinook salmon, king salmon, quinnat salmon (*Oncorhynchus tschawytscha*).
- Silver salmon, coho (*Oncorhynchus kisutch*).
- Blueback salmon, redfish, sockeye (*Oncorhynchus nerka*).
- Humpback salmon (*Oncorhynchus gorbuscha*).
- Steelhead trout, hardhead (*Salmo gairdneri*).
- Rainbow trout (*Salmo irideus*).
- Atlantic salmon (*Salmo salar*).
- Landlocked salmon (*Salmo sebago*).
- Blackspotted trouts: Yellowstone Lake trout or cutthroat trout (*Salmo lewisi*); Colorado River trout (*Salmo pleuriticus*); Tahoe trout (*Salmo henshawi*).
- Loch Leven trout (*Salmo trutta levensis*). Introduced species, propagated in limited numbers for observation.
- Lake trout, Mackinaw trout, longe, togue (*Cristivomer namaycush*).
- Brook trout, speckled trout (*Salvelinus fontinalis*).
- Sunapee trout (*Salvelinus aureolus*).

THE GRAYLINGS (THYMALLIDÆ):
- Montana grayling (*Thymallus montanus*).

THE SMELTS (ARGENTINIDÆ):
- American smelt (*Osmerus mordax*).

THE BASSES, SUNFISHES, AND CRAPPIES (CENTRARCHIDÆ):
- Crappie (*Pomoxis annularis*).
- Strawberry bass, calico bass (*Pomoxis sparoides*).
- Rock bass, red-eye, goggle-eye (*Ambloplites rupestris*).
- Warmouth, goggle-eye (*Chænobryttus gulosus*).
- Small-mouth black bass (*Micropterus dolomieu*).
- Large-mouth black bass (*Micropterus salmoides*).
- Bluegill bream, bluegill sunfish (*Lepomis pallidus*).
- Other sunfishes, chiefly *Eupomotis gibbosus*.

THE PERCHES (PERCIDÆ):
- Pike perch, wall-eyed pike, yellow pike, blue pike (*Stizostedion vitreum*).
- Yellow perch, ring perch (*Perca flavescens*).

THE SEA BASSES (SERRANIDÆ):
- Sea bass (*Centropristes striatus*).
- Striped bass, rockfish (*Roccus lineatus*).
- White bass (*Roccus chrysops*).
- White perch (*Morone americana*).
- Yellow bass (*Morone interrupta*).

THE MACKERELS (SCOMBRIDÆ):
- Mackerel (*Scomber scombrus*).

THE CODS (GADIDÆ):
- Cod (*Gadus callarias*).
- Haddock (*Melanogrammus æglefinus*.)
- Pollock (*Pollachius virens*).

THE FLOUNDERS (PLEURONECTIDÆ):
- Winter flounder, American flatfish (*Pseudopleuronectes americanus*).

CRUSTACEANS:
- American lobster (*Homarus americanus*).

After the annual seasons of high water in the Mississippi basin, great numbers of young fish are left in sloughs and pools when the waters have receded, and would eventually die by the drying up of these shallow places in summer or freezing in winter. Large collections are made from such sources, for return to the original stream and, of the most abundant species, also to supplement the hatchery stock for distribution. The fishes so collected in 1910 were as follows:

THE CATFISHES (SILURIDÆ):
- Spotted cat, blue cat, channel cat (*Ictalurus punctatus*). Only limited numbers obtainable.
- Horned pout, bullhead, yellow cat (*Ameiurus nebulosus*).

THE SUCKERS AND BUFFALOFISHES (CATOSTOMIDÆ):
- Small-mouth buffalofish (*Ictiobus bubalus*).

THE MINNOWS AND CARPS (CYPRINIDÆ):
- Carp (*Cyprinus carpio*). Distributed in rare instances, for waters unsuited to other species.

THE PIKES AND PICKERELS (ESOCIDÆ):
- Pike (*Esox lucius*). Restored to the streams; not distributed.
- Pickerel (*Esox reticulatus*). Restored to the streams; not distributed.

THE BASSES, SUNFISHES, AND CRAPPIES (CENTRARCHIDÆ):
- Crappie (*Pomoxis annularis*).
- Rock bass, red-eye, goggle-eye (*Ambloplites rupestris*).
- Warmouth, goggle-eye (*Chænobryttus gulosus*).
- Large-mouth black bass (*Micropterus salmoides*).

THE BASSES, SUNFISHES, AND CRAPPIES (CENTRARCHIDÆ)—Continued.

Small-mouth black-bass (*Micropterus dolomieu*).

Bluegill bream, bluegill sunfish (*Lepomis pallidus*).

Other sunfishes (chiefly *Eupomotis gibbosus*).

THE PERCHES (PERCIDÆ):

Yellow perch, ring perch (*Perca flavescens*).

THE CROAKERS (SCIÆNIDÆ):

Fresh-water drum, sheepshead, gaspergou (*Aplodinotus grunniens*). Only limited numbers obtainable. Not distributed.

Certain introduced species are propagated to a limited extent, as follows:

THE MINNOWS AND CARPS (CYPRINIDÆ):

Goldfish (*Carassius auratus*). Propagated for ornamental purposes; not distributed.

Ide (*Leuciscus idus*). Cultivated variety, golden ide. Propagated for ornamental purposes; not distributed.

OUTPUT.

Although unfavorable climatic conditions, in 1910, prevented the collection of as large numbers of eggs as usual, the superior quality obtained from the most important species made possible a 4 per cent increase over the previous record year of 1909. As appears in the Report of the Commissioner of Fisheries for 1910, this year's output of the stations was something over 473,000,000 eggs, 2,720,000,000 fry, and 36,000,000 fingerlings, yearlings, and adults, or more than 3,230,000,000 fish and eggs in all. The yield of the various species showed the usual fluctuations, there being notable increases in the blueback, silver, and Atlantic salmons, lake trout, lake herring, yellow perch, shad, cod, flatfish, and steelhead trout, offset to some extent by decreases in chinook salmon, whitefish, pike perch, and less important fishes.

The following table shows the work of the different stations in 1910, the period of operation, and the eggs and fish delivered by each station for distribution. It will be noted that transfers of eggs and fish from station to station are frequent, serving economy and convenience in transportation where the shipment consists of eggs, and giving advantageous distributing centers in the case of young fish. Transfers are in all cases credited to the receiving station in the column of totals, but for completeness of information are recorded opposite both shipping and receiving station in the columns headed "Transfers." The purpose of this table is to be distinguished from that of the summary of distributions on page 25 of this report, which is a statement of the number of eggs and fish actually delivered at their destination, all losses in shipment being deducted.

STATIONS OPERATED AND THE

NOTE.—The relative importance of the stations is in a degree indicated in the table by marginal indentions
haps shifting in location from year to year. At all other substations eggs were both collected and hatched.
stations to which they are, for administration purposes, subordinate; but it is not always possible to show

Station and period of operation.	Species.	Eggs.		
		Distributed.	Transfers to other stations.	Transfers from other stations.
Afognak, Alaska. Entire year.	Blueback salmon			
	Humpback salmon			
Baird, Cal. Entire year.	Chinook salmon	7,331,217	Nashua, 100,000. Central station, 15,000.	
	Rainbow trout	13,680		
	Brook trout			Leadville, 25,000
Battle Creek, Cal. Oct.-Jan.	Chinook salmon	7,358,800		
Derby, Nev. Jan.-May.	Blackspotted trout	438,550		
	Rainbow trout	100,000		
Mill Creek, Cal. Oct.-Jan.	Chinook salmon	15,849,450		
Baker Lake, Wash. Entire year.	Silver salmon	100,000		
	Chinook salmon			
	Blueback salmon	100,000		
	Steelhead trout			
Birdsview, Wash. Entire year.	Humpback salmon			
	Silver salmon	275,000		
	Steelhead trout	300,000	Cape Vincent, 25,000. Spearfish, 25,000	Day Creek, 769,000
	Chinook salmon			Illabott Creek, 431,740.
Day Creek, Wash. Feb.-June.	Steelhead trout		Birdsview, 769,000	
Illabott Creek, Wash. July-Oct.	Chinook salmon	439,990	Birdsview, 431,740	
Salmon Banks, San Juan Island, Wash. July-Oct.	Blueback salmon			
Battery, Havre de Grace, Md. Feb. 27-May 25.	Yellow perch	5,200,000		
	White perch	16,500,000		
	Shad	800,000		
	Striped bass			
Boothbay Harbor, Me. Entire year.	Lobster	780,000		
	Flatfish			
	Cod			
	Haddock			
Portland, Me. July 1-Jan. 1.	Lobster			
York, Me. July 1-Oct. 31.	do			
Bozeman, Mont. Entire year.	Brook trout			
	Blackspotted trout			Spearfish, 544,000
	Rainbow trout	85,000	Clackamas, 85,000	
	Grayling	25,000		
	Landlocked salmon			
	Lake trout			
	Steelhead trout			
Grayling, Mont. Mar. 1-June 30.	Rainbow trout			
	Grayling			
Soda Butte, National Park, Mont. June 16-20.	Blackspotted trout			
Bryans Point, Md. Feb. 21-May 23.	Yellow perch	4,030,000	Central Station, 4,030,000.	
	Shad	1,077,000	Central Station, 1,077,000.	
Cape Vincent, N. Y. Entire year.	Steelhead trout			Birdsview, 25,000
	Whitefish			Put-in-Bay, 25,000,000.
	Brook trout			
	Lake trout			Duluth, 5,100,000
	Pike perch			Put-in Bay, 5,000,000
	Landlocked salmon			Grand Lake Stream, 15,000.
	Rainbow trout			Wytheville, 50,000
	Yellow perch			

Output of Each, 1910.

and italic type, the italics being used to denote substations which were merely collecting points, per-
It should be added that some substations are more important in the actual fish-cultural work than the
the output of these important substations separate from that of the main hatchery.

Fry.			Fingerlings, yearlings, and adults.			Total output.
Distributed.	Transfers to other stations.	Transfers from other stations.	Distributed.	Transfers to other stations.	Transfers from other stations.	
68,422,170						68,422,170
363,740						363,740
2,286,257						9,502,474
						13,680
24,165						24,165
						7,358,800
718,020						1,156,570
						100,000
						15,849,450
5,808,848						5,908,848
149,570						149,570
4,554,825						4,654,825
14,400						14,400
1,368,000						1,368,000
5,079,177						5,354,177
1,422,938						
						1,672,938
705,840						705,840
						8,250
120,300,000						125,500,000
338,480,000						354,980,000
5,391,000						6,191,000
115,000						115,000
128,106,000			2,052			128,888,052
402,165,000						402,165,000
14,888,000						14,888,000
712,000						712,000
			353,818			353,818
			351,006			351,006
23,000			48,518			71,518
81,000			18			106,018
			17,000			17,000
			28,900			28,900
			18,718			18,718
200,285,000						200,285,000
31,065,000						31,065,000
46,761						46,761
20,170,000						20,170,000
941,500						941,500
4,852,000						4,852,000
4,800,000						4,800,000
14,500						14,500
38,000						38,000
1,600,000						1,600,000

STATIONS OPERATED AND THE

Station and period of operation.	Species.	Eggs.		
		Distributed.	Transfers to other stations.	Transfers from other stations.
Central Station, Washington, D. C. Entire year.	Sunfish			
	Crappie			
	Catfish			
	Smelt			
	Warmouth bass			
	Rock bass			
	Small-mouth black bass.			
	Large-mouth black bass.			
	Rainbow trout			Wytheville, 15,000
	Steelhead trout			
	Chinook salmon			Baird, 15,000
	Yellow perch			Bryans Point, 4,030,000
	Pike perch			Put-in Bay, 6,000,000
	Brook trout			St. Johnsbury, 20,000
	Whitefish			Put-in Bay, 640,000. Detroit, 500,000.
	Shad			Bryans Point, 1,077,000
Clackamas, Oregon City, Oreg. Entire year.	Rainbow trout			Bozeman, 85,000
	Brook trout			Leadville, 100,000
	Steelhead trout			Eagle Creek, 75,000
	Blackspotted trout			Spearfish, 100,000
	Lake trout			
	Chinook salmon	150,000		Rogue River, 61,600
Big White Salmon, Wash. Aug. 1–Feb. 28.	do			
Cazadero, Oreg.	Steelhead trout			Eagle Creek, 410,000
	Chinook salmon	2,452,000		
Eagle Creek, Clackamas River, Oreg. Mar. 15–June 25.	Steelhead trout	485,000	Cazadero, 410,000. Clackamas, 75,000.	
Eagle and Tanner Creeks, Oreg. Aug. 1–Oct. 1.	Chinook salmon	269,300		
Illinois River, Oreg Aug. 1–Apr. 30.	do	14,200	Rogue River, 14,200.	
Little White Salmon, Wash. Entire year.	do	3,805,000		
Rogue River, Oreg. Entire year.	do	484,000	Clackamas, 61,600	Illinois River, 14,200
	Steelhead trout			
Willamette, Oreg. Jan. 1–July 15.	Shad			
Bybee Bridge, Rogue River, Oreg. Aug. 1–Nov. 1.	Chinook salmon			
Cold Springs, Bullochville, Ga. Entire year.	Large-mouth black bass.			
	Sunfish			
	Catfish			
	Warmouth bass			
	Rock bass			
Craig Brook, East Orland, Me. Entire year.	Brook trout			St. Johnsbury, 5,000
	Atlantic salmon	1,345,000	Upper Penobsco t, Me., 1,340,000.	
Upper Penobscot, Me. Oct. 15–June 1.	do			Craig Brook, 1,340,000.
Duluth, Minn. Entire year.	Landlocked salmon.			Grand Lake Stream, 15,000.
	Brook trout			
	Whitefish			Detroit, 25,000,000
	Pike perch			Put-in Bay, 15,000,000.
	Steelhead trout			
	Lake trout	5,425,000	Cape Vincent, 5,100,000 Green Lake, 125,000.	Northville, 5,000,000
Grand Marais, Mich. Oct. 16–Nov. 18.	do			
Grand Marais, Minn. Sept. 19–Nov. 26.	do			
Grand Portage, Minn. Sept. 24–Oct. 15.	do			
Keweenaw Point, Mich. Oct. 4–Nov. 2.	do			
Marquette, Mich. Oct. 16–Nov. 11.	do			

OUTPUT OF EACH, 1910—Continued.

Fry.			Fingerlings, yearlings, and adults.			Total output.
Distributed.	Transfers to other stations.	Transfers from other stations.	Distributed.	Transfers to other stations.	Transfers from other stations.	
			5,600			5,600
			247			247
			450			450
			9,000			9,000
			752			752
			2.010			2,010
			1,000			1,000
			440			440
7,000						7,000
12,000						12,000
			10,000		Nashua, 10,000.	10,000
3,700,000						3,700,000
5,000,000						5,000,000
18,700						18,700
774,000						774,000
977,000						977,000
51,116						51,116
64.800						64,800
126,000						126,000
82,214			1,418			83,632
12,000						12,000
3,686,200			225			3,836,425
3,512,200						3,512,200
1,808,835						1,808,835
534,197						2,986,197
49,503						49,503
						269,300
4,808,000						8,613,000
660,292						1,082,692
89,850						89,850
1,678,000						1,678,000
...	...	...	...	...	...	...
			107,850			107,850
			7,080			7,080
			100			100
			40			40
			100			100
196,000			76,550	Nashua, 2,200.		272,550
155,799			82,413			243,212
1,217,366						1,217,366
			11,400			11,400
			370,000			370,000
25,000,000						25,000,000
13,800,000						13,800,000
			161,000			161,000
8,825,000			4,246,500			13,271,500
...	...	...	...	...	...	...
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STATIONS OPERATED AND THE

Station and period of operation.	Species.	Eggs.		
		Distributed.	Transfers to other stations.	Transfers from other stations.
Duluth, Minn.—Cont'd.				
Munising, Mich Oct. 16–Nov. 12.	Lake trout			
Ontonagon, Mich Oct. 16–Nov. 13.	do			
Two Harbors, Minn. Oct. 15–Nov. 1.	do			
Edenton, N. C. Jan. 2–June 30.	Shad	1,360,000		
Weldon, N. C. Apr. 1–May 30.	Striped bass	4,566,000		
Erwin, Tenn. Entire year.	Small-mouth black bass.			
	Large-mouth black bass.			
	Brook trout			
	Rainbow trout			Wytheville, 503,000.
	Catfish			
	Yellow perch			
	Sunfish			
	Rock bass			
Gloucester, Mass. Entire year.	Lobster			
	Pollock			
	Cod	34,689,000	Woods Hole, 24,835,000	
	Flatfish			
Green Lake, Me. Entire year.	Landlocked salmon.	55,000	St. Johnsbury, 5,000.	Grand Lake Stream, 704,799.
	Brook trout	25,000		
	Smelt	4,500,000		
	Lake trout			Duluth, 100,000. Northville, 300,000.
Branch Pond, Me. Sept. 13–Nov. 30.	Landlocked salmon.			
Grand Lake Stream, Me. Entire year.	Landlocked salmon.	824,799	Duluth, 15,000.	
			Spearfish, 25,000. Cape Vincent, 15,000. Green Lake, 704,799.	
Leadville, Colo. Entire year.	Brook trout	605,000	Baird, 25,000. Clackamas, 100,000.	
	Rainbow trout	55,000	Manchester, 10,000.	
	Lake trout			
	Blackspotted trout	235,000		
Cheesman Lake, Colo. Apr. 6–May 8.	Rainbow trout			
Darrah Lake, Colo. Nov. 11–Nov. 30.	Brook trout			
Edith Lake, Colo. Oct. 18–Nov. 28.	do			
Engelbrecht Lake, Colo. Oct. 16–Nov. 12.	do			
Grand Mesa Lakes, Colo. July 1–Aug. 1. Oct. 25–Nov. 11.	Blackspotted trout			
	Rainbow trout			
	Brook trout			
Musgroves Lake, Colo. Oct. 12–Dec. 6.	do			
Woodbridge, Colo. Nov. 27–Dec. 3.	do			
Mammoth Spring, Ark. Entire year.	Large-mouth black bass.			
	Small-mouth black bass.			
	Rainbow trout			
	Rock bass			
Des Arc, Ark. Mar. 4–May 7.	White bass			
Helena, Ark. Aug. 24–Dec. 29.	Catfish			
	Buffalo fish			
	Rock bass			
	Pike perch			
	Fresh-water drum			
	Sunfish			
	Crappie			
	Large-mouth black bass.			
	Yellow bass			
	White bass			

OUTPUT OF EACH, 1910—Continued.

Fry.			Fingerlings, yearlings, and adults.			Total output.
Distributed.	Transfers to other stations.	Transfers from other stations.	Distributed.	Transfers to other stations.	Transfers from other stations.	
48,262,000						49,622,000
2,669,000						7,235,000
			700			700
17,600			4,860			22,460
			233,600			233,600
			490,780			490,780
			230			230
			1,450			1,450
			18,535			18,535
			3,860			3,860
16,900,000						16,900,000
38,140,000						38,140,000
134,053,000						143,907,000
312,820,000						312,820,000
586,100			237,264			873,364
1,001,500						1,026,500
						4,500,000
351,922						351,922
						468,640
381,440			22,200			
2,612,880			379,640			3,472,520
325,600			217,625			588,225
24,700						24,700
565,600			37,000			837,600
			1,400			1,400
			82,510			82,510
			200			200
			4,300			4,300
			21,540			21,540
			178,675			178,675
			10,215			10,215
			800			800
			8,950			8,950
			85,365			85,365
			177,010			177,010
			18,230	Tupelo, 1,600		18,230
			250			250
			5,950			5,950

STATIONS OPERATED AND THE

Station and period of operation.	Species.	Eggs.		
		Distributed.	Transfers to other stations.	Transfers from other stations.
Manchester, Iowa. Entire year.	Rock bass			
	Pike perch			Put-in Bay, 3,500,000
	Brook trout			
	Lake trout			
	Rainbow trout	125,650		Leadville, 10,000
	Small-mouth black bass.			
La Crosse, Wis.[a] July 15–Oct. 19.	Sunfish			
	Yellow perch			
	Large-mouth black bass.			
	Catfish			
	Pickerel			
	Crappie			
	Carp			
	Buffalofish			
	Pike			
	Pike perch			
	White bass			
North McGregor, Iowa.[a] July 15–Oct. 6.	Crappie			
	Sunfish			
	Large-mouth black bass.			
	Catfish			
	Yellow perch			
	Carp			
	Pike			
	Fresh-water drum			
Nashua, N. H. Entire year.	Small-mouth black bass.			
	Sunapee trout			
	Brook trout			
	Chinook salmon			Baird, 100,000
	Rainbow trout			Wytheville, 50,000
Lake Sunapee, N. H. Oct. 13–Nov. 22.	Brook trout			
	Sunapee trout			
	Landlocked salmon			
Neosho, Mo. Entire year.	Rainbow trout	41,264		
	Large-mouth black bass.			
	Rock bass			
	Crappie			
	Carp			
	Yellow perch			
	Pike perch			Put-in Bay, 1,800,000
Northville, Mich. Entire year.	Small-mouth black bass.			
	Brook trout			
	Rainbow trout			Wytheville, 100,000
	Lake trout	34,894,000	Duluth, 5,000,000. Green Lake, 300,000. Sault Ste. Marie, 5,000,000. Alpena, 4,000,000. Charlevoix, 10,584,000.	Charlevoix, 3,066,560
Alpena, Mich. Feb. 23–May 4.	Lake trout			Northville, 4,000,000
	Whitefish			Detroit, 15,000,000
Bay City, Mich. Apr. 1–Apr. 29.	Pike perch			
Belle Isle, Mich. Oct. 25–Dec. 12.	Whitefish			
Charlevoix, Mich. Oct. 20–Dec. 21. Feb. 28–May 4.	Lake trout	3,066,560	Northville, 3,066,560	Northville, 10,584,000
	Whitefish			Detroit, 15,000,000
Cheboygan, Mich. Oct. 18–Nov. 15.	Lake trout			
Detour, Mich. Oct. 15–Nov. 10.	do			

[a] Station for the collection of fishes from overflowed lands.

OUTPUT OF EACH, 1910—Continued.

Fry.			Fingerlings, yearlings, and adults.			Total output.
Distributed.	Transfers to other stations.	Transfers from other stations.	Distributed.	Transfers to other stations.	Transfers from other stations.	
			8,300			8,300
3,300,000						3,300,000
			866,500			866,500
			3,880			3,880
			85,700			211,350
			9,695			9,695
			53,875			53,875
			10,320			10,320
			77,025			77,025
			111,500			111,500
			500			500
			102,820			102,820
			22,300			22,300
			22,800			22,800
			39,500			39,500
			4,460			4,460
			100			100
			95,125			95,125
			136,100			136,100
			162,025			162,025
			384,700			384,700
			84,700			84,700
			115			115
			3,800			3,800
			3,000			3,000
21,600						21,600
171,029						171,029
788,000						788,000
		St. Johnsbury, 104,000.	57,300		Craig Brook, 2,200. Central Station, 10,000.	57,300
168,500			52,855			262,619
			11,650			11,650
			30,025			30,025
			12,950			12,950
			115			115
			50			50
1,400,000						1,400,000
162,000			14,000			176,000
426,000			106,200			532,200
500			82,000			82,500
			3,500			10,013,500
4,000,000						4,000,000
15,000,000						15,000,000
10,584,000						10,584,000
15,000,000						15,000,000

STATIONS OPERATED AND THE

Station and period of operation.	Species.	Eggs.		
		Distributed.	Transfers to other stations.	Transfers from other stations.
Northville, Mich.—Con.				
Detroit, Mich. Entire year.	Whitefish	74,500,000	Central Station, 500,000. Duluth, 20,000,000. Sault Ste. Marie, 20,000,000. Alpena, 15,000,000. Charlevoix, 15,000,000.	
	Pike perch	34,280,000		
Fairport, Mich. Oct. 20–Nov. 23.	Lake trout			
Grand Haven, Mich. Nov. 6–Nov. 18.	do			
Grassy Island, Mich. Oct. 25–Dec. 12.	Whitefish			
Naubinway, Mich. Nov. 15–Nov. 24.	do			
Northport, Mich. Oct. 26–Nov. 18.	Lake trout			
Port Huron, Mich. May 1–May 20.	Pike perch			
St. James, Mich. Nov. 1–Nov. 24.	Lake trout			
Sault Ste. Marie, Mich. Feb. 20–May 21.	Whitefish			Detroit, 20,000,000.
	Lake trout			Northville, 5,000,000.
Manistique, Mich. Oct. 15–Nov. 22.	do			
Put-in Bay, Ohio. Entire year.	Pike perch	324,475,000	Duluth, 15,000,000. Central Station, 6,000,000. Neosho, 1,800,000. Meredosia, 5,000,000. Wytheville, 1,000,000. Manchester, 3,500,000. Cape Vincent, 5,000,000.	
	Whitefish	77,068,000	Cape Vincent, 25,000,000. Central Station, 640,000.	
	Lake herring	1,440,000		
Kelleys Island, Ohio. Nov. 10–Nov. 23.	Whitefish			
Middle Bass, Ohio. Nov. 7–Dec. 3.	do			
Monroe, Mich. Nov. 1–Nov. 28.	do			
Apr. 1–Apr. 20.	Pike perch			
North Bass Island, Ohio. Nov. 5–Dec. 3.	Whitefish			
Apr. 16–28.	Pike perch			
Port Clinton, Ohio. Nov. 3–Dec. 2.	Whitefish			
Apr. 3–May 7.	Pike perch			
Toledo, Ohio. Apr. 1–May 11.	do			
Quincy, Ill. Entire year.				
Meredosia, Ill.[a] July–Dec.	Crappie			
	Carp			
	Large-mouth black bass.			
	Catfish			
	Yellow perch			
	Sunfish			
	Pike perch			Put-in Bay, 5,000,000.
St. Johnsbury, Vt. Entire year.	Brook trout	35,000	Central Station, 20,000. Craig Brook, 5,000.	
	Small-mouth black bass.			
	Landlocked salmon.			Green Lake, 5,000.
	Yellow perch			
Darling Pond, Vt. Sept. 1–Dec. 21.	Brook trout			
Hatch Pond, South Ryegate, Vt. Aug. 9–Nov. 13.	do			
Lake Mitchell, Vt. Sept. 1–Dec. 17.	Brook trout			

[a] Station for the collection of fishes from overflowed lands.

OUTPUT OF EACH, 1910—Continued.

Fry.			Fingerlings, yearlings, and adults.			Total output.
Distributed.	Transfers to other stations.	Transfers from other stations.	Distributed.	Transfers to other stations.	Transfers from other stations.	
25,000,000						29,000,000
12,100,000						46,380,000
20,000,000						20,000,000
5,000,000						5,000,000
89,375,000						376,550,000
75,020,000						126,448,000
70,300,000						71,740,000
			20,100			20,100
			35			35
			108,045			108,045
			25,350			25,350
			9,055			9,055
			25,000			25,000
4,250,000						4,250,000
1,661,000	Holden,300,000.		346		Holden, 31,425.	1,267,346
	Nashua,104,000.					
140,000			2,550			142,550
4,800	Holden, 1,800.				Holden, 1,000.	3,000
			3,595			3,595

STATIONS OPERATED AND THE

Station and period of operation.	Species.	Eggs.		
		Distributed.	Transfers to other stations.	Transfers from other stations.
St. Johnsbury, Vt.—Con.				
Holden, Vt. July 1-Nov. 13.	Brook trout			
Apr. 12-June 30.	Landlocked salmon.			
	Lake trout			
Swanton, Vt. Mar. 15-June 2.	Pike perch			
	Yellow perch			
San Marcos, Tex. Entire year.	Sunfish			
	Rock bass			
	Large-mouth black bass.			
	Crappie			
	Carp			
Spearfish, S. Dak. Entire year.	Brook trout			
	Landlocked salmon.			Grand Lake Stream, 25,000.
	Loch Leven trout.			
	Blackspotted trout.	2,719,000	Clackamas, 100,000. Bozeman, 544,000.	
	Rainbow trout			Wytheville, 100,000.
	Steelhead trout			Birdsview, 25,000.
Sand Creek, Beulah, Wyo. Oct. 20-Jan. 15.	Brook trout			
Schmidt Lake, S. Dak. Oct. 20-Dec. 31.	do			
Thumb of Lake, Yellowstone National Park, Wyo. May 25-Aug. 1.	Blackspotted trout.			
Clear Creek, Yellowstone National Park, Wyo. June 1-Aug. 10.	do			
Columbine Creek, Yellowstone National Park, Wyo. June 1-Aug. 10.	do			
Cub Creek, Yellowstone National Park, Wyo. June 1-Aug. 10.	do			
Steamer Fish Hawk, Delaware River, Philadelphia, Pa. May 6-June 1.	Shad			
Tupelo, Miss. Entire year.	Sunfish			
	Large-mouth black bass.			
	Crappie			
	Catfish			
White Sulphur Springs, W. Va. Entire year.	Rainbow trout	100,900		
	Brook trout	1,000		
	Large-mouth black bass.			
	Small-mouth black bass.			
	Blackspotted trout.			
Woods Hole, Mass. Entire year.	Lobster			
	Cod			Gloucester, 24,835,000.
	Mackerel			
	Flatfish			
	Sea bass			
Chilmark, Mass. Oct. 1-Oct. 9.	Lobster			
East Greenwich, Mass. Mar. 1-Apr. 1.	Flatfish			
Gosnold, Mass. Sept. 16-Oct. 9. May 23-June 23.	Lobster			
Newport, R. I. Mar. 10-Apr. 1.	Flatfish			

OUTPUT OF EACH, 1910—Continued.

Fry.			Fingerlings, yearlings, and adults.			Total output.
Distributed.	Transfers to other stations.	Transfers from other stations.	Distributed.	Transfers to other stations.	Transfers from other stations.	
		St. Johnsbury, 300,000.	177,975	St. Johnsbury, 31,425.		177,975
		St. Johnsbury, 1,800.	3,500	St. Johnsbury, 1,000.		3,500
			3,370			3,370
20,000,000						20,000,000
1,000,000						1,000,000
			4,130			4,130
			3,335			3,335
			138,239			138,239
			9,675			9,675
			25			25
			684,000			684,000
			12,000			12,000
			68,248			68,248
	Bozeman, 400,000		514,750			2,989,750
			234,775			234,775
1,703,000						1,703,000
			9,950			9,950
			18,850		Helena, 1,600	18,850
			1,550			1,550
			100			100
			262,275			363,175
59,000			821,870			881,870
			3,200			3,200
200,000			1,750			201,750
			2,480			2,480
17,499,000						17,499,000
61,413,000						61,413,000
764,000						764,000
215,770,000						215,770,000
808,000						808,000

Station and period of operation.	Species.	Eggs.		
		Distributed.	Transfers to other stations.	Transfers from other stations.
Woods Hole, Mass.—Continued.				
Noank, Conn. Sept. 29–Oct. 21.	Lobster			
Plymouth, Mass. Nov. 10–Mar. 22.	Cod			
Sandwich, Mass. May 3–June 23.	Lobster			
Waquoit, Mass. Jan. 20–Mar. 23.	Flatfish			
Westport, Mass. May 3–June 23.	Lobster			
West Tisbury, Mass. May 3–June 23. Oct. 1–Oct. 10.	do			
Wickford, R. I. Mar. 17–Apr. 1.	Flatfish			
Wytheville, Va. Entire year.	Large-mouth black bass.			
	Small-mouth black bass.			
	Rock bass			
	Yellow perch			
	Rainbow trout	948,000	Erwin, 503,000. Cape Vincent, 50,000. Nashua, 50,000. Spearfish, 100,000. Central Station, 15,000. Northville, 100,000.	
	Brook trout			
	Carp			
	Pike perch			Put-in Bay, 1,000,000.
Yes Bay, Alaska. Entire year.	Blueback salmon			
Total output of Bureau.				

OUTPUT OF EACH, 1910—Continued.

Fry.			Fingerlings, yearlings, and adults.			Total output.
Distributed.	Transfers to other stations.	Transfers from other stations.	Distributed.	Transfers to other stations.	Transfers from other stations.	
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39,000	...	...	29,225	...	...	68,225
14,000	...	...	1,100	...	...	15,100
...	...	...	11,250	...	...	11,250
...	...	...	125	...	Erwin, 575	125
...	...	...	230,600	...	...	360,600
...	...	...	173,450	...	...	173,450
...	...	...	120	...	...	120
1,000,000	...	...	...	...	...	1,000,000
48,160,000	...	...	21,719,600	...	...	69,879,600
...	...	...	...	...	...	3,233,012,237

ALLOTMENTS TO STATE FISH COMMISSIONS.

As usual, various state fish commissions were supplied from the Bureau's stock with eggs to be hatched and distributed under their respective auspices. Following is a record of such allotments in 1910:

ALLOTMENTS OF FISH AND EGGS TO STATE FISH COMMISSIONS, FISCAL YEAR 1910.

State and species.	Eggs.	Fingerlings, yearlings, and adults.
California:		
Chinook salmon	28,764,467	
Colorado:		
Blackspotted trout	225,000	
Connecticut:		
Yellow perch	5,200,000	
Illinois:		
Lake trout	500,000	
Whitefish	4,000,000	
Pike perch	8,000,000	
Rainbow trout	41,264	
Michigan:		
Landlocked salmon	20,000	
Lake trout	5,000,000	3,500
Pike perch	34,280,000	
Missouri:		
Brook trout	100,000	
Rainbow trout	25,000	
Pike perch	2,000,000	
Minnesota:		
Large-mouth black bass		18,250
Montana:		
Blackspotted trout	550,000	
Whitefish	500,000	
Nevada:		
Blackspotted trout	422,100	
New Hampshire:		
Chinook salmon	100,000	
New York:		
Blackspotted trout	50,000	
Rainbow trout	41,500	
Landlocked salmon	15,000	
White perch	15,000,000	
North Dakota:		
Steelhead trout	100,000	
Pike perch	10,000,000	
Ohio:		
Whitefish	18,000,000	
Pike perch	170,725,000	
Oregon:		
Chinook salmon	6,465,300	60
Blackspotted trout	175,000	45
Pennsylvania:		
Silver salmon	75,000	
Blackspotted trout	50,000	
Whitefish	31,428,000	
Pike perch	96,450,000	
Washington:		
Steelhead trout	50,000	
Brook trout	100,000	
Wisconsin:		
Lake trout	4,500,000	3,880
Wyoming:		
Blackspotted trout	675,000	
Total	443,627,631	25,735

SHIPMENTS TO FOREIGN COUNTRIES.

In response to requests reaching the Bureau through diplomatic channels, fish and fish eggs have been donated to foreign countries as follows:

SHIPMENTS OF FISH AND EGGS TO FOREIGN COUNTRIES, FISCAL YEAR 1910.

Country.	Species.	Eggs.	Fingerlings, yearlings, and adults.
Argentina	Chinook salmon	200,000	
	Silver salmon	100,000	
	Blueback salmon	100,000	
	Landlocked salmon	25,000	
	Lake trout	50,000	
France	Blackspotted trout	10,000	
Japan	Rainbow trout	110,000	
	Brook trout	5,000	
Mexico	Carp		25
Total		600,000	25

SUMMARIZED STATEMENT OF DISTRIBUTIONS.

The following table shows the numbers of eggs and fish actually distributed during the fiscal year 1910; or, in other words, the output of the hatcheries with all losses in transportation deducted. It thus does not agree with the tabulated summary in the Annual Report of the Commissioner for this year, compiled at an earlier date, which shows the numbers of eggs and fish delivered by the stations for distribution, the subsequent losses in transportation not being considered:

SUMMARY OF DISTRIBUTION OF FISH AND EGGS, FISCAL YEAR 1910.

Species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Total.
Catfish			531,892	531,892
Carp			22,710	22,710
Buffalofish			201,475	201,475
Shad	2,160,000	89,076,000		91,236,000
Whitefish	55,428,000	195,719,000		251,147,000
Lake herring	1,440,000	70,300,000		71,740,000
Silver salmon	375,000	10,888,025		11,263,025
Chinook salmon	37,531,417	16,342,556	66,045	53,940,018
Blueback salmon	100,000	121,136,995	21,719,600	142,956,595
Humpback salmon		1,731,740		1,731,740
Steelhead trout	250,000	3,570,287	179,718	4,000,005
Rainbow trout	556,494	595,616	1,705,328	2,857,438
Atlantic salmon	5,000	1,217,366	238,212	1,460,578
Landlocked salmon	115,000	974,040	301,064	1,390,104
Blackspotted trout	2,748,550	1,756,094	906,654	5,411,298
Loch Leven trout			68,248	68,248
Lake trout	10,210,000	33,645,922	4,286,150	48,142,072
Brook trout	516,000	7,365,945	4,085,174	11,967,119
Sunapee trout		171,029		171,029
Grayling	25,000	81,000	18	106,018
Smelt	4,500,000		9,000	4,509,000
Pike			43,300	43,300
Pickerel			500	500
Crappie and strawberry bass			410,428	410,428
Rock bass			66,035	66,035
Warmouth bass			792	792
Small-mouth black bass		537,400	109,986	647,386
Large-mouth black bass		56,600	665,868	722,468
Sunfish (bream)			342,825	342,825
Pike perch	321,455,000	154,480,000	5,260	475,940,260
Yellow perch	5,200,000	326,885,000	108,439	332,193,439
Striped bass	4,566,000	2,784,000		7,350,000
White bass			6,050	6,050
White perch	16,500,000	338,480,000		354,980,000
Yellow bass			250	250
Sea bass		808,000		808,000
Mackerel		764,000		764,000
Freshwater drum			11,950	11,950
Cod	9,854,000	210,354,000		220,208,000
Pollock		38,140,000		38,140,000
Haddock		712,000		712,000
Flatfish		930,755,000		930,755,000
Lobster		162,505,000	1,532	162,506,532
Total	473,535,461	2,721,832,615	36,094,503	3,231,462,579

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS, FISCAL YEAR 1910.

CATFISH.

Disposition.	Fingerlings, yearlings, and adults.
Arizona:	
Grand Canyon, Berry's pond	100
Summit Pond	100
Holbrook, Becker's reservoir	100
Pratt's pond	100
Prescott, American Ranch Lake	100
Wilcox, Adling's pond	100
Ditmar's pond	100
Arkansas:	
Boonville, Branch Pond	100
Green Forest, Willow Pond	100
Harrison, Estes's pond	125
Helena, Mississippi River	20,640
Hiawassee, Rucker's pond	100
McNeil, Stevens's pond	275
Mammoth Spring, Warm Fork Creek	100
Stamps, Price Pond	150
Colorado:	
Pueblo, Skinner's reservoir	100
Rifle, White River	200
Georgia:	
Chamblee, Jones's pond	100
Idaho:	
Grangeville, Tolo Lake	300
Naples, Stampede Lake	300
Illinois:	
Avena, Sycamore Lake	400
Chicago, Armour's pond	450
Otis's pond	450
Galva, Mirror Pond	500
Odell, Odell Pond	500
Tremont, Pflederer's pond	500
Indiana:	
Boonville, Hemenway's pond	500
Buckskin, Buck's pond	100
Centerville, Townsend's pond	100
Evansville, Bockstege's pond	100
Heltonville, Ramsey's pond	100
Lewis, Freeze's pond	100
Pleasant Lake, Pleasant Lake	200
Tilden, Hadley's pond	300
Iowa:	
Chester, Upper Iowa River	400
Independence, Wapsipinicon River	400
Lime Springs, Upper Iowa River	2,500
Manchester, Maquoketa River	4,000
North McGregor, Mississippi River	187,500
Kansas:	
Goddard, Clear Creek Pond	65
Kansas City, Hosps's pond	80
Marquette, Sunny Pond	65
Pawnee, Payton's pond	65
Kentucky:	
Elizabethtown, Hagan's pond	200
Hodgensville, Nolin Creek	400
Nolin Creek, North Fork	300
Tharpe's pond	200
Louisiana:	
Grand Cane, Clear Springs Pond	100
Maryland:	
Loch Raven, Harrison's pond	150
Mountain Lock, Potomac River	450
Rocky Ridge, Owings Creek	150
Sharon, Rogers Pond	150
Massachusetts:	
Westdale, Taunton River	500
Michigan:	
Collins, Grand River	480
Jackson, Big Portage Lake	480
Grass Lake	480
Lakeview, Brimmer Lake	1,000
Tamarack Lake	1,000
Town Line Lake	1,000
Penn, Mud Lake	650
Portland, Grand River Pond	480
Minnesota:	
Brownsville, Mississippi River	43,250
Mahnomen, Mayzhuckegishig Lake	800
Rochester, Zumbro River, South Fork	500
Mississippi:	
Guntown, Cochran's pond	100
Missouri:	
Brandsville, Niessen's pond	150
Richland, Gasconade River	400
Seligman, Mountain Pond	200
Springfield, Appleby's pond	200
New Jersey:	
Mullica Hill, Mullica Hill Pond	400
Pompton Lakes, Pompton Lakes	400
Washington, Fair Haven Pond	100
New Mexico:	
Clovis, Laughing Water Pond	100
Columbus, Kennedy's pond	80
Corona, Ingram's pond	80
Deming, Burney's pond	100
Harris's pond	200
Hon's pond	100
Jacobson's pond	100
Kelly's pond	100
Elida, Brown's pond	100
La Lande, McGill's reservoir	100
Las Vegas, Asylum Lake	100
Pecos River	100
Montoya, Paloma Springs	80
Portales, Humble's pond	100
Twin Mill Ponds	100
Silver City, Central Creek Pond	100
Texico, Stafford's pond	100
Tucumcari, Buchanan's pond	80
New York:	
Cooperstown, Schuylers Lake	300
Greenport, Sills Pond	150
Unadilla, Susquehanna River	300
Walden, Wallkill River	152
Wallkill, Dwaarskill Creek	155
North Dakota:	
Devils Lake, Devils Lake	3,000
Glen Ullin, Burns's pond	100
Gwinner, Edmon's pond	150
Milnor, Stone Lake	100
Oakes, Christenson's pond	150
St. John, Bouvin Lake	400
Ohio:	
Bethel, McCarty's pond	100
Bradford, Greenville Creek	250
Upper Stillwater Creek	150
Cincinnati, Lake Como	150
Cridersville, Retreat Lake	100
Dola, Hively's pond	100
Ironton, Rucker's pond	150
Jackson, Long's pond	100
Marion, Scioto River	250
Orbiston, Orbiston Lakes	100
Ravenna, Infirmary Pond	150
Ripley, Hauke's pond	150
Rock Creek, Parks's pond	100
Stryker, Juillard's pond	100
Wapakoneta, Brown Pond	400
Youngstown, Mahoning River	100
Wickliffe Lake	200
Oklahoma:	
Aline, Elliott's pond	100
Bison, Springdale Pond	100
Chilocco, Chilocco Lagoon	200
Collinsville, Ellingswood Lake	200
Cushing, Prairie Lake	100
Twin Elm Lake	125
Wild Horse Pond	150
Enid, Spring Valley Creek	100
Erick, Garrett's pond	100

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CATFISH—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Oklahoma—Continued.	
Glencoe, Greenwood Lake	75
South Side Pond	75
Guymon, Jordan's pond	250
Hastings, Wabash Pond	125
Isabella, Wahl's pond	100
Lawton, Park Lake	175
Maramec, Maramec Lake	150
Marshall, Crouch's pond	100
Proctor's pond	100
Perkins, Canon Pond	75
Stigler, Hall's pond	200
Stillwater, Boomer Creek	100
Kautz's ponds	75
Nash's pond	75
Swartz's pond	75
Stratford, Davis's pond	100
Waynoka, Hancock's pond	275
Yost, Newman's pond	75
Yost Lake	75
Pennsylvania:	
Birdsboro, Monocacy Creek	200
Carbon Center, Carbon Center Pond	100
Factoryville, Lake Carey	350
Greensburg, Hacke Pond	100
Kingston, Ryman's pond	400
Rahns, Perkiomen Creek	400
Reading, Maiden Creek	400
Rupert, Wide Water Canal	200
Scottdale, Mill Race Pond	150
Smiths Ferry, Woodlawn Pond	100
Susquehanna, Churchill's lake	300
Susquehanna River	300
Troy, Cross Roads Creek	100
Lillmary Creek	100
Mud Creek	100
Sugar Creek	450
Wilkes Barre, Bear Lake	150
Wolmesdorf, Tulpehocken Creek	400
Wagners Pond	400
South Carolina:	
Blackville, Rodgers Pond	175
Graycourt, North Rabun Creek	125
Honea Path, Barkers Creek	150
Broad Creek	200
Haynie Pond	150
Kays Pond	200
Pickens, Bivers Lake	250
Holders Lake	250
Spring Lake	300
Thornley Pond	200
South Carolina—Continued.	
Starr, Pruitt's pond	125
Walhalla, Carey's pond	125
South Dakota:	
Fairfax, Manhalter's pond	150
Philip, Grindstone Pond	200
Presho, Corkill's lake	200
Scenic, Knutson's pond	200
Warner, Papke's pond	200
Vermont:	
Bellows Falls, Connecticut River	400
Virginia:	
Covington, McAllister's pond	150
Dillwyn, North River	300
Slate River	300
Gainesville, Broad Run	300
Houston, Easley Mill Pond	230
Occoquan, Occoquan River	300
Palmyra, Rivanna River	350
Urbanna, Jackson's pond	550
Washington:	
Addy, Blue Lake	75
Spring Lake	75
Anacortes, Lake Erie	150
Montesano, Silvia Lake	150
Oroville, Lemonosky Lake	150
West Virginia:	
Bedington, Emerson's pond	150
Benwood, Riedel's pond	250
Grafton, Otter Creek Pond	250
Nuttall, Chalybeate Spring Pond	250
Romney, Potomac River, South Branch	550
Wisconsin:	
Brillion, Long Lake	300
Round Lake	300
Genoa, Mississippi River	4,166
La Crosse, Mississippi River	47,418
Mauston, Drainage Canal	300
Pelican, Little Mud Lake	300
Rice Lake	400
Prairie du Chien, Mississippi River	172,500
Sheboygan Falls, Sheboygan River	500
Victory, Mississippi River	1,666
Wyoming:	
Lusk, "J. M." Company's pond	400
Moorcroft, Lone Tree Reservoir	200
Newcastle, Lodge Pole Creek	250
Sheridan, Big Horn Pond	150
Total[a]	531,892

CARP.

Kansas:	
Pittsburg, North Lake	35
Minnesota:	
Brownsville, Mississippi River	8,650
New York:	
Riverhead, Harrison's pond	100
Oklahoma:	
Stillwater, Willow Pond	100
Vian, Allen's pond	15
Virginia:	
Wytheville, Brownings Mill Pond	110
Indian Creek	10
West Virginia:	
Moundsville, Jones's pond	15
Wisconsin:	
Genoa, Mississippi River	1,666
La Crosse, Mississippi River	10,318
Victory, Mississippi River	1,666
Mexico:	
Sonora, Ysabel Lake	25
Total	22,710

[a] Lost in transit, 12,078 fingerlings.

Details of Distribution of Fish and Fish Eggs—Continued.

BUFFALOFISH.

Disposition.	Fingerlings, yearlings, and adults.	Disposition.	Fingerlings, yearlings, and adults.
Arkansas:		Wisconsin:	
Helena, Mississippi River	178,675	Genoa, Mississippi River	2,666
Minnesota:		La Crosse, Mississippi River	11,318
Brownsville, Mississippi River	8,650	Victory, Mississippi River	166
		Total	201,475

SHAD.

Disposition.	Eggs.	Fry.	Disposition.	Eggs.	Fry.
District of Columbia:			New Jersey—Continued.		
Washington, Anacostia River		295,000	Riverton, Delaware River		80,000
Potomac River		682,000	Timber Creek, Delaware River		120,000
Maryland:			New York:		
Accokeek Creek, Potomac River		980,000	New York, New York Aquarium	800,000	
Broad Creek, Potomac River		2,504,000	North Carolina:		
Carpenters Point, North East River		234,000	Edenton, Albemarle Sound	1,360,000	47,762,000
Havre de Grace, Chesapeake Bay		3,485,000	Tarboro, Tar River		500,000
Susquehanna River		821,000	Oregon:		
Swan Creek		396,000	Willamette, Willamette River		1,588,000
Occoquan Bay, Potomac River		898,000	Pennsylvania:		
Pamunkey Creek, Potomac River		5,044,000	Poquessing Creek, Delaware River		200,000
Piscataway Creek, Potomac River		4,621,000	Virginia:		
Swan Creek, Chesapeake Bay		70,000	Dogue Creek, Potomac River		2,401,000
Potomac River		3,572,000	Little Hunting Creek, Potomac River		2,717,000
Wild Duck Harbor, Susquehanna River		385,000	Occoquan Creek, Potomac River		3,391,000
New Jersey:			Pamunkey Creek, Potomac River		600,000
Camden, Delaware River		803,000	Pohick Creek, Potomac River		4,337,000
Rancocas, Delaware River		500,000	Washington:		
			Hamilton, Skagit River		90,000
			Total	2,160,000	89,076,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

WHITEFISH.

Disposition.	Eggs.	Fry.
Illinois:		
Havana, Illinois Fish Commission	4,000,000	....
Michigan:		
Alpena, Lake Huron	....	1,000,000
Belle Isle, Lake St. Clair	....	9,000,000
Detour, Lake Huron	....	6,000,000
" Lake Michigan	....	3,000,000
Detroit, Detroit River	....	16,000,000
Escanaba, Lake Michigan	....	2,000,000
Fish Island, Lake Superior	....	490,000
Isle Royale, Lake Superior	....	13,100,000
McCargoes Cove, Lake Superior	....	210,000
Manistique, Lake Michigan	....	2,000,000
Marquette, Lake Superior	....	4,655,000
North Point, Lake Huron	....	9,000,000
Skilligallee Reef, Lake Michigan	....	5,000,000
St. Ignace, Lake Huron	....	2,000,000
Sand Bay Reef, Lake Michigan	....	5,000,000
Scarecrow Island, Lake Huron	....	5,000,000
Simmons Reef, Lake Michigan	....	5,000,000
Whitefish Point, Lake Superior	....	5,000,000
Minnesota:		
Duluth, Lake Superior	....	300,000
Grand Marais, Lake Superior	....	3,000,000
Susie Island, Lake Superior	....	3,000,000
Montana:		
Anaconda, Montana State Fishery	500,000	....
New York:		
Cape Vincent, Lake Ontario	....	1,500,000
Chaumont, Lake Ontario	....	2,000,000
Cooperstown, Otsego Lake	....	387,000
Fox Island, Lake Ontario	....	3,500,000
Fullers Bay, Lake Ontario	....	170,000
Grenadier Island, Lake Ontario	....	5,500,000
Hayes Point, Lake Ontario	....	2,000,000
Mexico, Lake Ontario	....	4,000,000
New York, New York Aquarium	1,500,000	....
Oneida Lake, Oneida Lake	....	387,000
Wilson Bay, Lake Ontario	....	1,500,000
Ohio:		
Catawba Island, Lake Erie	....	10,000,000
Isle St. George, Lake Erie	....	10,000,000
Kelleys Island, Lake Erie	....	20,000,000
Lakeside, Lake Erie	....	20,000
Put-in Bay, Lake Erie	....	25,000,000
Ohio State Fish Commission	18,000,000	....
Toledo, Lake Erie	....	10,000,000
Pennsylvania:		
Erie, Pennsylvania Fish Commission	31,428,000	....
Total [a]	55,428,000	195,719,000

LAKE HERRING, OR CISCO.

Disposition.	Eggs.	Fry.
Ohio:		
Cleveland, Lake Erie	1,440,000	....
Isle St. George, Lake Erie	....	10,000,000
Kelleys Island, Lake Erie	....	10,000,000
Lakeside, Lake Erie	....	300,000
Middle Bass, Lake Erie	....	20,000,000
Ohio—Continued.		
Port Clinton, Lake Erie	....	10,000,000
Put-in Bay, Lake Erie	....	10,000,000
Toledo, Lake Erie	....	10,000,000
Total	1,440,000	70,300,000

SILVER SALMON.

Disposition.	Eggs.	Fry.
California:		
Brookdale, San Lorenzo River	100,000	....
Santa Cruz County Hatchery	100,000	....
Pennsylvania:		
Pleasant Mount, State Fish Commission	75,000	....
Washington:		
Baker, Baker Lake	....	5,308,848
Lower Baker River	....	500,000
Birdsview, Grandy Creek	....	5,079,177
Argentina:		
Buenos Aires, Argentine Government	100,000	....
Total	375,000	10,888,025

[a] Lost in transit, 245,000 fry.

Details of Distribution of Fish and Fish Eggs—Continued.

CHINOOK SALMON.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
California:			
Baird, McCloud River		2,286,257	
Brookdale, Santa Cruz County Hatchery	1,000,000		
Eel River, California Fish Commission	1,549,500		
Point Reyes, applicant	300,000		
Sisson, California Fish Commission	27,214,967		
New Hampshire:			
Edgemont, Lake Sunapee			7,380
Laconia, New Hampshire Fish Commission	100,000		
Newbury, Lake Sunapee			51,200
New York:			
New York, New York Aquarium	5,000		
Port Kent, Lake Champlain			3,600
Tuxedo Park, applicant	25,000		
Westport, Lake Champlain			3,640
Oregon:			
Bonneville, Oregon Fish Commission	6,465,300		
Cazadero, Clackamas River		534,197	
Clackamas, Clackamas River		3,686,200	70
Oregon Fish Commission			60
Rogue River, Elk Creek		160,362	
Rogue River		499,930	
Wedderburn, applicant	572,400		
Washington:			
Baker, Baker Lake		349,570	
Big White Salmon, Columbia River		2,612,200	
Spring Creek		900,000	
Birdsview, Grandy Creek		705,840	
Little White Salmon, Columbia River		1,900,000	
Little White Salmon River		2,908,000	
Seattle, Exposition Aquarium	99,250		95
Argentina:			
Buenos Aires, Argentine Government	200,000		
Total[a]	37,531,417	16,342,556	66,045

BLUEBACK SALMON.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Alaska:			
Afognak, Ahuyon Creek		34,018,060	
Letnik Lake		34,404,110	
Yes Bay, McDonald Lake			21,719,600
Yes River		48,160,000	
Washington:			
Baker, Baker Lake		4,404,825	
Lower Baker River, Lower Baker River		150,000	
Argentina:			
Buenos Aires, Argentine Government	100,000		
Total	100,000	121,136,995	21,719,600

[a] Lost in transit, 1,480 fingerlings.

HUMPBACK SALMON.

Disposition.	Fry.
Alaska:	
Afognak, Letnik Lake	363,740
Washington:	
Birdsview, Grandy Creek	1,368,000
Total	1,731,740

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

STEELHEAD TROUT.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maryland:			
Clear Spring, Tom Run Pond		12,000	
Michigan:			
Humboldt, Black River			10,000
Michigamme River			10,000
Spruce River			10,000
Munising, applicant	50,000		
Watersmeet, Duck Lake			14,000
Wetmore, Big Indian River			32,000
Minnesota:			
Duluth, Canosia Lake			12,000
Pike Lake			21,000
Knife River, Mic Mac Lake			12,000
Teteagonche Lake			16,000
Montana:			
Bozeman, Bridger Creek			8,300
Deer Lodge, Powell Lake			1,500
Libby, Kootenai River			400
Logging Creek, Belt Creek			2,500
Norris, Madison River Power Co. Lake			6,000
New York:			
Auburn, Owasco Lake		35,423	
Pulaski, Salmon River		11,338	
North Dakota:			
St. John, State fish commission	100,000		
Oregon:			
Cazadero, Clackamas River		1,934,835	
Eagle Creek, Eagle Creek		49,503	
Rogue River, Elk Creek		89,850	
Washington:			
Baker, Baker Lake		14,400	
Birdsview, Day Creek		40,300	
Grandy Creek		1,382,638	
Seattle, Exposition Aquarium			18
State Fish Commission	50,000		
Walla Walla, applicant	25,000		
Wisconsin:			
Hudson, applicant	25,000		
Lampson, Horse Shoe Lake			14,000
Spooner, Christie Lake			10,000
Total	250,000	3,570,287	179,718

RAINBOW TROUT.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Alabama:			
Tanner, Pecks Branch			2,400
Arizona:			
Flagstaff, Live Oak Creek			7,200
Rock Creek			7,200
Tucson, Sabino Creek			6,000
Winslow, Chevelon Creek			7,200
Arkansas:			
Bald Knob, Hart's pond			4,000
Berryville, Osage River		25,000	
Crickette, Yocum Creek			4,000
Decatur, Lakeside Pond		7,500	
Elkins, White River			800
Flippin, Goff's pond		7,500	
Greenwood, Vache Grass Creek		7,000	
Mammoth Spring, Spring River			200
Springdale, Lake Vaughan		7,000	
Sulphur Springs, Williams's pond		7,000	
California:			
Brookdale, Santa Cruz County hatchery	13,680		
Colorado:			
Buena Vista, Chalk Creek			6,000
Cottonwood Creek			6,000
Middle Cottonwood Creek			6,000
South Cottonwood Creek			6,000
Buffalo, Platte River			10,000
Cimarron, Little Cimarron Creek		2,000	
Colorado Springs, Frost's reservoir			25
Creede, applicant	100,000		
Eldora, Lake Eldora			8,535
Estabrook, Mendenhall Creek			3,750

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Colorado—Continued.			
Grand Mesa Lakes, Ward Lake		55,000	
Grant, Geneva Lake			2,500
Platte River			10,000
Ivanhoe, Frying Pan River		10,500	
Jefferson, Platte River		25,000	
Kline, Platte River		25,000	
Leadville, Musgrove's pond			20,000
Malta, Big Thompson Stream	20,000		
Minturn, Eagle River			9,000
Moffat, Saguache Creek		25,000	
Molina, Cottonwood Lakes		11,000	
Montrose, East Dry Creek		4,000	
New Castle, Divide Creek			9,000
Elk Creek			9,000
Pine Grove, Elk Creek			3,750
Wright's lake			2,500
Pueblo, Gunnison River		10,000	
West Elk Creek		10,000	
Salida, Little River		7,500	
South Arkansas River		10,000	
Shawnee, Price Creek			2,500
South Platte, South Platte River			10,000
South Platte River, South Fork			12,500
Telluride, Dolores River			10,000
Thomasville, applicant		25,000	
Twin Lakes, Willow Lake		4,000	
Webster, Beaver Creek			2,500
West Cliffe, Brush Creek Lake			6,000
Swift Creek			6,000
Georgia:			
Clayton, Hiawassee River			4,000
Mathias, Tallulah River			4,000
Oakman, Dry Creek			4,000
Rabun Gap, Charley Creek			3,200
Flat Branch			2,400
Mill Creek			3,200
Shook Creek			2,400
Tallulah River			4,000
Tate Creek			2,400
Ringgold, Murphy's pond			1,600
Idaho:			
Ashton, Eggbert Lake			1,000
Bliss, Far View Lakes			1,500
Cambridge, Little Weiser River			1,000
Hailey, applicant	5,000		
Priest River, Skookum Pond			500
Troy, Pineview Pond			600
Illinois:			
Havana, Illinois Fish Commission	41,264		
Indiana:			
St. Paul, Mill Creek			2,000
South Bend, Beyer's lake			1,000
Leeper Pond			1,000
Iowa:			
Manchester, Maquoketa River			400
North McGregor, Bloody Run			3,000
Postville, Livinggood Creek			600
Waukon, Silver Creek			1,000
Village Creek			1,500
Kansas:			
Erie, Canville Creek			200
Marion, Spring Creek			2,000
Maryland:			
Cumberland, Evitts Creek			3,000
Lakewood Lake			2,000
Minley Branch			2,500
Rocky Gap Creek			2,000
Mountain Lake Park, Broad Ford Creek			5,000
Little Youghiogheny River			480
Oakland, Browning Dam			5,000
Harvey's pond			320
Westminster, Fairview Pond			500
Michigan:			
Brentcreek, Gillett's pond			1,000
East Tawas, Cold Creek			5,000
Gaylord, Sturgeon River			15,000
Gladwin, Cedar River			1,250
Grayling, Tillula Lake			590

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Michigan—Continued.			
Hillman, Thunder Bay River			10,000
Kalamazoo, applicant	10,000		
Halls Springs Brook			2,000
Portage Creek			2,000
Paris, Muskegon River			18,000
Petersburg, Crystal Pond			6,000
Plymouth, Millers Creek			500
Rose Center, Buckhorn Creek			12,000
West Branch, Chapman Creek			400
Tittabawassa River			1,250
Wingleton, Marquette River			18,750
Marquette River, South Branch			3,500
Minnesota:			
Duluth, Archer Creek			1,800
Silica, Little Swan Creek			3,000
Winona, Stockton Creek			2,500
Missouri:			
Aurora, Spring Creek			400
Turnback Creek			4,000
Wistman Creek			400
Bourbon, Blue Spring Branch			6,190
Brown Springs, Brown Springs Lake			400
Cabool, Flag Lake		12,500	
Clever, King's pond		7,500	
Lucas Branch			4,000
Silver Lake Branch		20,000	
Exeter, Roaring River		20,000	
Galena, Langley's pond			4,000
Marshfield, James River			6,000
Neosho, Hickory River			55
Newburg, Little Piney River			6,810
Mill Creek			4,000
Reeds Spring, Moose Springs		2,500	
St. James, Meramec Springs			6,000
St. Joseph, Missouri Fish Commission	25,000		
Springfield, Spring Creek		15,000	
Verona, Spring River		30,000	
Wheaton, Joys Creek			400
Pogues Creek			400
Shoal Creek			800
Montana:			
Armstead, McIntosh Creek			1,200
Spring Creek			1,200
Bozeman, Wild Horse Run			2,000
Chinook, Box Elder Creek			2,000
Columbia Falls, Fish Lake			2,000
Delphia, Half Moon Lake			1,000
Dillon, Ajax Creek			960
Blacktail Deer Creek			900
Carter Creek			2,400
Lake Creek			960
North Fork River			960
Stewart Gulch			960
Strowbridge's pond			960
Tent Lake			1,200
Van Camp Creek			1,200
Emigrant, Dailey's lake			2,000
Fortine, Fortine Creek			2,000
Lakeview, Cliff Lake		4,000	4,000
Elk Creek		10,000	
Elk Lake		5,000	
Hidden Lake		4,000	
Thompson, Clear Creek			1,500
Squaw Creek			1,500
Townsend, Duck Creek			2,000
Nebraska:			
Andrews, White River			10,000
Gretna, Chadron Creek			1,600
Nevada:			
Verdi, Boulder Riffles			4,000
Chalk Bluff Pools			4,000
Marble Works Pools			4,000
Truckee River			8,000
New Jersey:			
Jersey City, Witterman's pond			2,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New Mexico:			
Cimarron, Aqua Fria Creek			2,000
Canon Bonita Creek			1,000
Cimarroncita Creek			1,000
Cimarron River			1,000
Clear Creek			1,000
Ponil Creek			1,000
Rayado Creek			1,000
Las Vegas, Gallinas River, West Fork		2,400	
Raton, Myrtle Pond		1,200	
Sugarite Creek		6,000	
Roswell, Crystal Pond			2,000
New York:			
Adams, Big Sandy Creek		19,000	
Buffalo, New York State Cancer Laboratory		500	
Clifton, Wittenman Pond			2,000
Linlithgo, Forest, Fish, and Game Commission	41,500		
New York, New York Aquarium	5,000		
Valhalla, Wygoda Pond			400
Willsboro, Warm Pond		19,000	
North Carolina:			
Addie, Buff Creek			1,600
Asheville, French Broad River			100
Midget Lake			1,600
Balsam, Scotts Creek			3,200
Barnard, Big Pine Creek			4,000
Black Mountain, Swanannoa River			75
Boonford, Big Crabtree Creek			2,100
South Toe River			125
Toe River			150
Brevard, Allison's lake			4,000
Bryson, Alarka Creek			3,200
Andress Creek			2,400
Bald Creek			2,400
Bear Creek			2,400
Bear Meat Creek			2,400
Big Hurricane Creek			2,400
Bridge Creek			2,400
Cherry Creek			2,400
Clingman Creek			2,400
Cold Spring			2,400
Conley Creek			2,400
Cooper Creek			2,400
Cullasowah Creek			2,400
Deep Creek			3,200
Galbreath Creek			2,400
Grassy Branch			2,400
Indian Creek			2,400
Jenkins Creek			2,400
Jones Creek			2,400
Kirkland Creek			8,000
Lands Creek			2,400
Laurel Creek			2,400
Little Hurricane Creek			2,400
Long Creek			7,200
Middle Hurricane Creek			2,400
Mill Creek			2,400
Nettle Creek			2,400
Noland Creek			3,200
North Fork Creek			1,600
Peach Tree Creek			2,400
Pigeon Creek			2,400
Saw Mill Creek			2,400
Shepherd Creek			2,400
Silver Creek			2,400
Una Creek			2,400
Watkins Creek			2,400
West Fork Creek			1,600
Bushnell, Chambers Creek			3,200
Indian Camp Creek			2,400
Kirklin Creek			2,400
Little Laurel Creek			2,400
Stecoah Creek			2,400
Cherokee, Lufty Creek			2,400
Soco Creek			4,800
Cranberry, Blevin Creek			75
Cranberry Creek			75
Roaring Creek			3,200

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
North Carolina—Continued.			
Dillsboro, Big Savannah Creek			2,400
Dick Creek			2,400
Savannah Creek, East Fork			2,400
Elk Park, Banners Elk Creek			3,200
Dutch Creek			75
Elk River			4,800
Flat Rock, Lake Anina			2,400
Forneys, Mill Creek			3,200
Franklin, Burningtown Creek			4,800
Ellijay Creek			3,200
Tesentee Creek			4,800
Goldsboro, Melton Pond			3,200
Hendersonville, Big Hungry Creek			4,000
Boylston Creek			4,000
Green River			4,800
Kanuga Lake			1,600
Laurel Creek			2,400
Kellerville, Buckeye Creek			50
Laurel Creek			75
Lake Toxaway, Lake Toxaway			64,800
Linville Falls, Caleb Creek			1,400
Cane Creek			1,400
Irish Creek			1,400
Katy Creek			1,400
Linville River			4,200
Magazine Creek			1,400
Marion, Allison Creek			1,400
Bill Creek			1,400
Bow Creek			4,000
Buffalo Creek			1,400
Burgin Creek			1,400
Camp Rock Creek			1,400
Cedar Creek			1,400
Cherry Creek			2,400
Chestnut Fork Creek			1,400
Cove Creek			1,400
Crooked Creek			1,400
Curtis Creek			1,400
Davidson Creek			1,400
Devils Fork Creek			1,400
Duncan Creek			2,100
Fall Branch			2,400
Ford Creek			2,400
Gladis Creek			1,400
Hall Creek			700
Harrar Creek			3,200
Harris Creek			1,400
Little Fork Creek			2,400
Little River			1,400
Mackey Creek			1,400
Maple Creek			1,400
Newberry Fork Creek			1,400
Paddy Fork Creek			1,400
Pigeon Roost Creek			1,400
Roaring Fork Creek			1,400
Sahadrec Creek			1,400
Singed Cat Creek			1,400
Six Mile Creek			2,400
Spring Creek			2,400
Stony Creek			3,200
Turkey Creek			1,400
Turkey Otter Creek			1,400
Vess Creek			2,400
Morrisville, Sorrell's pond			800
Sycamore Pond			3,200
Old Fort, Crooked Creek Pond			700
Otto, Tesenta Pond			3,200
Pineola, Linville River			450
Poplar, Poplar Creek			1,475
Relief, Lewis's pond			200
Sevier, Armstrong Creek			1,400
Back Creek			1,400
Ball Creek			2,800
Beaver Creek			1,400
Crib Creek			1,400

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
North Carolina—Continued.			
Sevier, Dobson Creek			700
Dysart Creek			1,400
Indian Creek			1,400
Lime Kiln Creek			1,400
Nix Creek			1,400
North Fork Creek			1,400
Oil Mill Creek			1,400
Owens Creek			1,400
Rollins Creek			1,400
Steel Creek			1,400
Table Creek			1,400
York Creek			700
Swain, Oconalufty River			4,800
Sylva, Abs Creek			1,600
Chastain Creek			2,400
Cullowhee Creek			4,000
Johns Creek			2,400
Moses Creek			2,400
Mull Creek			3,200
Ruft Bitt Creek			3,200
Sugar Creek			2,400
Toecane, Big Rock Creek			75
Greasey Creek			75
Linn Creek			75
Tomotla, Peachtree Creek			3,200
Tryon, Pocolet River			4,000
Vaughn Creek			4,000
Tuxedo, Green River			12,000
Pace Creek			3,200
Rock Creek			5,600
Vale, Cow Camp Creek			75
Willits, Scotts Creek			3,200
Winston-Salem, Nissen Park Pond			1,600
North Dakota:			
Braddock, Otter Creek			1,450
Edinburg, Park River, Middle Fork			2,000
Glen Ullin, Curlew Creek			1,000
Hebron, Knife River			500
Ohio:			
Akron, Adams's pond			2,000
Zanesville, Licking River			5,000
Oregon:			
Austin, Strawberry Lake		5,400	
Baker City, Burnt River, North Fork		6,000	
Deer Creek		3,000	
Downey Lake		3,000	
Eagle Creek		5,500	
Fish Lake		3,000	
Hilgard, Beaver Creek		3,000	
Five Points Creek		6,000	
Jordan Creek		3,000	
Meadow Brook		2,000	
Oregon City, Pine Creek		10,116	
Pennsylvania:			
Bainbridge, Engle Run			1,000
Hoffman Run			1,000
Stackstown Run			1,000
Benton, West Creek			5,000
Berlin, Blue Lick Creek			5,000
Brush Creek			4,000
Chambersburg, Birch Creek			6,000
Carbaugh Run			4,000
Hoosic Run			4,000
Cherry Tree, Cush Creek			4,000
Cherry Run, Penn Run			375
Clarendon, Arnots Run			3,000
Farensworth Creek			4,000
Four Mile Run			3,000
Tionesta Creek			3,000
Tionesta Creek, West Branch			5,000
Cresco, Bushkill River			2,400
Goose Run			1,500
Levis Branch			1,500
Ebensburg, Chest Creek			2,000
Frackville, Kaufman Dam			3,000
Glen Iron, Penns Run			1,125
Green Hill, Big Woods Pond			800

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Lanesboro, Tunkhannock Creek			6,000
Lehighton, Wild Creek			3,000
Lenover, Weaver Run			2,000
Middleport, Morgan Dam			1,500
Millersburg, Forney Run			2,000
Little Wicanisco Creek			3,000
Norristown, Elmwood Park Lake			2,000
Paddy Mountain, Penns Run			2,250
Pardee, Penns Run			375
Ridgeway, Big Mill Creek			4,000
Rising Springs, Penns Creek			5,000
Somerfield, Youghiogheny Creek			7,000
Tunkhannock, Bowmans Creek			6,000
Weikert, Penns Run			375
South Carolina:			
Cleveland, Middle Saluda River			4,000
Greenville, South Saluda River			4,000
Rosman, Cane Creek			3,200
Estatoe Creek			4,000
South Dakota:			
Buffalo Gap, Beaver Creek			150
Cascade Springs, Cascade Springs			12,500
Custer, French Creek			5,775
Spring Creek			5,000
Deadwood, Polo Creek			8,000
Elmore, Spearfish Creek			5,325
Hermosa, Squaw Creek			150
Hill City, Newton Fork Creek			5,625
Palmer Creek			2,500
Slate Creek			2,500
Spring Creek			5,775
Sunday Creek			5,625
Hot Springs, Palmer Lake			12,500
Iron Creek, Spearfish Creek			4,500
Nahant, Tilson Creek			3,750
Pine Ridge Agency, Wolf Creek			12,500
Rapid City, Dark Canyon Pond			12,500
Rapid Creek			23,150
Slate Creek			150
Spring Creek			300
St. Onge, False Bottom Creek			600
Scenic, Conklin Lake			25,000
Snowma, Stearn's pond			500
Spearfish, Driskill's pond			500
Spearfish Creek			2,000
Sturgis, Deadmans Creek			10,000
Spring Creek			10,000
Tennessee:			
Belleview, South Harpeth Creek			4,000
Blevins, Doe River			100
Bristol, Sinking Creek			125
Butler, Cable's pond			1,200
Lineback's pond			75
Spring Lake			800
Concord, Doughty's pond			800
Kirby's pond			800
Doyle Station, Sink Creek			1,600
Ducktown, Rough Creek			3,200
Dunn, Sugar Creek, West Fork			1,600
Elizabethtown, Hunter's Lake			100
Farner, Camp Creek			2,450
Fishery, North Indian Creek			2,185
Spring Branch			220
Fish Springs, Watauga River			4,800
Greenville, Camp Creek			4,000
Hampton, Laurel Creek			175
Hunter, Brush Creek			4,000
Johnson City, Brush Creek			3,200
Knoxville, Tennessee River			50
Marbleton, Garland's pond			1,000
Maryville, Mountain Pond			800
Oakdale, Emory Pond			125
Roan Mountain, Doe River			4,800
Hampton Creek			3,200
Heaton Creek			3,200
Rutledge, Manly's pond			1,600
Sevierville, Layman's pond			800

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Tennessee—Continued.			
Sparta, Calf Killer Creek			4,000
Springfield, Red River			4,000
Telford, Bailey's pond			50
Tullahoma, Compton Creek			3,200
Walland, Hesser Creek			4,000
Little River			4,125
Wolf Creek, Wolf Creek			4,000
Utah:			
Charleston, applicant	125,000		
Murray, applicant	59,400		
Provo, Dry Creek Pond		6,000	
Provo River		48,000	
Virginia:			
Afton, Afton Pond			300
Ashland, South Anna River			8,000
Big Island, Hunting Creek			2,500
Cedar Bluff, Indian Creek			12,000
Cleveland, Bacon Creek			3,000
Big Cedar Creek			18,000
Burgess Creek			9,000
Gilmer Creek			3,000
Little Cedar Creek			12,000
Opossum Creek			6,000
Covington, Cedar Creek			4,000
Falling Springs Run			200
Culpeper, Hazel River			4,800
Miller Creek		7,000	
Faber, Cover Creek			6,400
Fairwood, Big Holton Creek			6,400
Marion, Holston River, South Fork			12,000
Mount Jackson, Garlick Hollow Run			800
Natural Bridge, Cedar Creek Dam			500
New Castle, Meadow Creek			2,000
Roanoke, Falling Creek Reservoir			3,200
Vinton Spring Lake			2,400
Rural Retreat, Buchanan's pond			2,400
Salem, Back Creek			8,000
Seven Mile Ford, Comer Creek			12,000
Holston River, South Fork			8,000
Somerset, Rapidan River			1,125
Springwood, Cummings's pond			300
Stanley, Henderson's pond			1,000
Sugar Grove, Holston River, South Fork			8,000
Waynesboro, Lithia Pond			300
West Point, Remlick Hall Pond			3,000
Wytheville, Cove Creek			6,400
Washington:			
Colville, Black Lake			2,000
Colville River			3,000
Harrington, Crab Creek			4,000
Republic, Granite Creek			4,000
Seattle, Exposition Aquarium			18
Sumner, Salmon Creek Pond			1,000
Valley, Bond Lake			3,000
West Virginia:			
Blake, Loup Creek			1,500
Capon Springs, Trout Run			3,650
Yellow Stream Gap			3,650
Holly Junction, Elk River			750
Keyser, Patterson Creek			4,300
Marlinton, Elk River			2,500
Midvale, Middle Fork River			7,500
Rippon, Wiest's pond			1,000
Seebert, Cranberry Creek			38,500
Spring Creek, Sinking Creek			3,000
Stonewall, Piney Creek			21,000
Surveyor, Clay Pond			500
White Sulphur Springs, Howard Creek			3,000
Spring Branch			2,000
Wildell, Greenbrier River			5,000
Laurel Run			5,000
Wright, Piney Run			24,000

Details of Distribution of Fish and Fish Eggs—Continued.

RAINBOW TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin:			
Independence, Borst Valley Creek			3,000
Chimney Rock Creek			3,000
Cook Creek			1,200
Elk Creek			3,000
Fox Creek			1,500
Tamarack Creek			2,500
Traverse Valley Creek			3,000
Trempealeau River			3,000
Kendall, Lumsden Creek			1,200
Tunnell Creek			1,500
Sparta, Lower La Crosse River			3,000
Spring Valley, Eau Galle River			4,000
Wyoming:			
Beulah, Sand Creek			5,000
Cheyenne, Polaris Reservoir		12,000	
Lander, Glacier Lake			3,600
Lodge Pole Lake			2,000
Shoshone Lake			2,000
Laramie, Laramie River		7,000	
Moorcroft, Riordan Lake			1,000
Sheridan, Patrick's reservoir			1,500
Wamsutter, Bens Lake			300
Wheatland, Development Company's reservoir			10,000
Yellowstone National Park, Rock Lake			10,000
Gibbon River			15,000
Japan:			
Tokio, Imperial Household Department	110,000		
Total[a]	556,494	595,616	1,705,328

ATLANTIC SALMON.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
District of Columbia:			
Washington, Central Station Aquarium			100
Maine:			
Brownville, Pleasant River			76,500
East Orland, Alamoosook Lake			5,139
Guilford, Piscataquis River			41,000
Milo, Pleasant River			33,000
Staceyville, Penobscot River		1,217,366	82,413
New York:			
Buffalo, New York State Cancer Laboratory			60
New York, New York Aquarium	5,000		
Total	5,000	1,217,366	288,212

LANDLOCKED SALMON.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Idaho:			
Hope, Lake Pend d'Oreille			4,000
Maine:			
Auburn, Lake Auburn			7,500
Taylor's pond		33,000	
Augusta, Cobbosseecontee Lake			7,500
Baker, Baker's pond			2,000
Bingham, Rowe's pond			2,000
Brewer Junction Brewer Pond			2,751
Brownfield, Moose Pond		24,750	
Bryant Pond, Lake Christopher		16,500	
Twickell Pond		16,500	
Bucksport, Toddy Pond			6,000
Dedham, Branch Pond		30,000	5,000
Green Lake			15,000
Dover, Sebec Lake			10,500
East Orland, Alamoosook Lake			13
Ellsworth, Patten's pond		25,000	2,000
Ellsworth Falls, Alligator Lake			6,000
Beach Hill Pond		20,000	
Flood's pond		24,750	

a Lost in transit, 18,100 fry.

Details of Distribution of Fish and Fish Eggs—Continued.

LANDLOCKED SALMON—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maine—Continued.			
Enfield, Cold Stream Pond			9,000
Farmington, Big Island Pond			4,500
Franklin, Donnell's pond		24,750	
George's pond		24,750	
Molasses Pond		24,750	
Green Lake, Arnold's pond			4,500
Grand Lake Stream, Dobsis Lake		65,000	4,500
Grand Lake		316,440	17,700
Holden, Fitz Pond		24,750	
Kennebunk, Kennebunk Pond		24,750	
Kinco Station, Moosehead Lake		32,000	10,500
Lincoln, Mattamawcook Lake		5,000	
Mosquito, Lake Moxie		18,000	
Newport, Lake Sebasticook			13,500
North Anson, Great Emden Lake		24,750	
Oquossoc, Rangeley Lakes			9,000
Otis, Green Lake		50,000	70,000
Peru, Worthley's pond		21,600	
Phillips Lake, Phillips Lake			6,000
Portage, Portage Lake		30,000	3,500
Sawyers Island, Campbell's pond			3,000
Sebago Lake, Sebago Lake		15,000	
Skowhegan, Lake George		24,750	
South Paris, Concord Pond			6,000
Strong, Sweet's pond			6,000
Thorndike, St. Georges Lake			7,500
Tunk Pond, Tunk Pond		24,750	6,000
Warren, Crawford's lake			6,000
Wescott, Little Ossipee Pond			5,700
Wilton, Wilson Lake		15,000	
Michigan:			
Munising, applicant	10,000		
Sault Ste. Marie, Michigan Fish Commission	20,000		
Montana:			
Gardner, Yellowstone Park waters			8,000
New York:			
Old Forge, applicant	15,000		
Forest, Fish, and Game Commission	15,000		
Pleasant Lake, Pleasant Lake		14,500	
Raquette Lake, Lake Kora	30,000		
Vermont:			
Averill, Averill Pond			1,000
Little Averill Lake		2,000	
Brandon, Lake Dunmore			2,500
Newport, Salem Pond		1,000	
Washington:			
Ephrata, Moses Lake			5,000
Wisconsin:			
Luck, McKenzie Lake			11,400
Wyoming:			
Lander, Christiana Lake			5,000
Grave Lake			5,000
Argentina:			
Buenos Aires, Argentine Government	25,000		
Total[a]	115,000	974,040	301,064

BLACKSPOTTED TROUT.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Arizona:			
Grand Canyon, Hull Pond			3,750
Little Hull Pond			3,750
Colorado:			
Antonito, Conejos River		19,440	
La Jara River		4,320	
Cardinal, Develin Lakes and Creek		9,500	
Cascade, Cascade Brook		10,000	
Cebolla, Elk Creek		10,000	
Gunnison River		25,796	
Red Creek		4,000	
Cimarron, Little Cimarron River		10,000	
Cliff, Platte River		4,800	
DeBeque, Bull Creek Lake		15,000	

[a] Lost in transit, 11,000 fry and 2,300 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Colorado—Continued.			
Denver, Colorado Fish Commission	225,000		
Dillon, Rock Creek		3,600	
Slate Creek		3,600	
Straight Creek		3,600	
Fort Collins, Cache la Poudre River		30,700	
Pine Creek		31,010	
Glenisle, Platte River		3,600	
Glenwood Springs, Mitchell Creek		10,000	
Grand Valley, Parachute Creek		10,000	
Gunnison, Bird Lakes		4,000	
Insmont, Rock Creek		2,400	
Loveland, Big Thompson		40,746	
Marshall, South Boulder Creek		14,400	
Molina, Cottonwood Creek		10,000	
Cottonwood Lakes		52,748	
East Bull Creek		10,000	
Monte Vista, Rock Creek, South Fork		6,000	
Montrose, Big Red Canyon Creek		8,000	
Spring Creek		6,000	
West Dry Creek		6,000	
Nast, Frying Pan River		10,500	
New Castle, Divide Creek		12,500	
Parlin, Quartz Creek		6,000	
Pine Grove, Elk Creek		4,800	
Ridgway, Cow Creek		12,000	
Dallas Creek		12,000	
Rifle, Williams River		22,000	
Salida, Arkansas River		22,500	
Little River		7,500	
Poncha Creek		10,000	
South Fork, Rio Grande River, South Fork		6,000	
Wheeler, West Tenmile Creek		8,400	
Idaho:			
Bonner County, Bonanza Lake			10,000
Darsey, Stevens Peak Lake			7,500
Greer, Wells Pond			2,500
McCammon, Mountainview Lake			3,000
Rupert, Lake Walcott			12,000
Soda Springs, Knollins Springs			3,000
Spirit Lake, Kit Carson Creek			5,000
Twin Falls, Blue Lake Creek	50,000		
Wallace, Lost Lake			7,500
Michigan:			
Detroit, Detroit Aquarium	10,000		
Montana:			
Anaconda, Montana Fish Commission	550,000		
Baker, Baker Lake			16,000
Ballantine, Arrow Creek			4,000
Belton, Lake McDonald			12,000
Big Timber, Big Boulder River			4,000
Bozeman, West Gallatin River, South Fork			5,000
Butte, Columbia Gardens Hatchery	440,000		
Chinook, Peoples Creek			8,000
Chinook, Snake Creek			8,000
Craig, Burke's reservoir			6,000
Darby, Tin Cup Lake			10,000
Dorsey, Checkerboard Creek			6,000
Little Birch Creek			6,000
Woods Gulch Creek			6,000
Harlowton, Musselshell River			8,000
Havre, Clear Creek			6,000
Helena, Chessman Reservoir			8,000
Josephine, Sixteen Mile Creek			8,000
Kalispell, Corneilson's spring			6,000
Corneilson's lake			6,000
Howser's lake			6,000
Lewistown, Beaver Creek			6,000
Big Casino Creek			6,000
Big Spring Creek			14,000
Casino Creek			6,000
Cottonwood Creek			12,000
Surprenant's pond			12,000
Livingston, Fitzpatrick's pond			2,000
Trowbridge Creek			4,000
Martinsdale, Musselshell River, North Fork			8,000
Missoula, Bitter Root River			10,000
Monarch, Tillinghast Creek			6,000
Neihart, Belt Creek			6,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Montana—Continued.			
Red Lodge, Silver Run			2,000
Somers, Lake Alexander			6,000
Skagg Lake			6,000
Townsend, Due Creek			6,000
Twodot, Haymaker Pond			6,000
Winston, Stanbach Reservoir			6,000
Nebraska:			
Chadron, Big Bordeaux Creek			12,000
Nevada:			
Derby, Nevada Fish Commission	298,300		
Truckee River		85,000	
Verdi, Bates's pond			3,000
Galena Creek			3,000
Nevada Fish Commission	123,800		
South Branch			3,000
Truckee River	16,450	633,020	6,000
Whites Creek			3,000
New Mexico:			
Cimarron, Cañon Bonito Creek			2,000
Cimarronciti Creek			2,000
Cimarron River			2,000
Clear Creek			2,000
Ponil Creek			2,000
Rayado Creek			2,000
Rayado River, West Fork			3,000
Ute Creek			4,000
Glorieta, Pecos River		14,400	
Las Vegas, Burro Branch		4,800	
Gallinas River		6,000	
Mountain Park, Fresnal Creek			15,000
Sante Fe, Rio Tesuque River		7,200	
New York:			
New York, New York Aquarium	25,000		
Saranac Inn, Forest, Fish, and Game Commission	50,000		
Oregon:			
Clackamas, Oregon fish commission			45
Medford, Four Bit Creek		12,000	
Rancharee Creek		12,000	
Rogue River		16,000	
Milwaukee, Lechler Lake		8,000	
Newberg, Walton's pond		14,214	
Oregon City, Clackamas River		20,000	
Portland, Oregon fish commission	175,000		
Pennsylvania:			
Pleasant Mount, Pennsylvania fish commission	50,000		
South Dakota:			
Aberdeen, Milwaukee Reservoir			10,000
Buffalo Gap, Beaver Creek			7,000
Custer, Flynn Creek			16,000
French Creek			6,000
Elmore, Spearfish Creek			35,000
Spearfish Creek, Southwest Branch			9,000
Englewood, White Wood Creek			30,000
Hermosa, Squaw Creek			5,000
Hill City, Castle Creek			30,000
Spring Creek			21,000
Hisega, Rapid Creek			35,000
Iron Creek, Spearfish River			8,000
Maitland, Fredbert Pond			5,000
Mystic, Rapid Creek			30,000
Rapid City, Electric Light Pond			12,500
North Side Park Pond			2,500
Price Pond			6,000
Rapid Creek			47,750
Slate Creek			5,000
Spring Creek			6,000
Saint Onge, False Bottom Creek			40,000
Spearfish, Spearfish Creek			25,000
Utah:			
Provo, applicant	50,000		
Provo River		20,000	
Virginia:			
Sweet Chalybeate, Sweet Springs Branch			2,480
Washington:			
Seattle, Exposition Aquarium	50,000		42
Spokane, Selheim Springs Pond			5,000
Walla Walla, Shelton's lake			737
Spring Creek			600
Winona, Palouse River			10,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wyoming:			
Beulah, Crystal Springs			6,000
Crook County, Sand Creek			15,000
Yellowstone National Park, Cub Creek		400,000	
Lander, Grave Lake			11,200
Hobbs Lake			4,200
Raft Lake			5,600
Little Wind River, South Fork			5,600
Trail Lake			8,400
Laramie, Wyoming fish commission	175,000		
Moorcroft, Prairie Creek			21,250
Sheridan, Wyoming fish commission	500,000		
Shoshone, Big Wind Lake			15,000
Wamsutter, Stocks Lake			18,750
France:			
Bellefontaine, French Government	10,000		
Total[a]	2,748,550	1,756,094	906,654

LOCH LEVEN TROUT.

South Dakota:			
Savoy, Little Spearfish Creek			68,248

LAKE TROUT.

Colorado:			
Twin Lakes, Upper Twin Lake		24,700	
Idaho:			
Hope, Lake Pend d'Oreille			18,000
Rathdrum, Twin Lake			4,000
Illinois:			
Havana, Illinois Fish Commission	500,000		
Maine:			
Bridgton, Highland Lake		11,000	
Cherryfield, Mopang Lake		11,000	
East Wilton, Pease Pond		11,000	
Green Lake, Green Lake		263,922	
North Anson, Great Emden Lake		11,000	
Readfield, Parker's pond		11,000	
Skowhegan, Lake George		10,000	
Unity, Unity Pond		11,000	
Massachusetts:			
Marlboro, Lake Williams		9,000	
Michigan:			
Big Rock Reef, Lake Michigan		756,000	
Cat Head Reef, Lake Michigan		756,000	
Charlevoix Reef, Lake Michigan		2,268,000	
Charlevoix, Pine Lake		756,000	
Detour, Lake Huron		2,000,000	
Detroit, Detroit Aquarium	10,000		
Escanaba, Lake Michigan		150,000	
Fishermans Island, Lake Michigan		1,512,000	
Fish Island, Lake Superior		600,000	
Grand Marais, Lake Superior		700,000	
Isle Royale, Lake Superior		1,975,000	2,052,500
Long Point, Lake Superior			600,000
McCargoes Cove, Lake Superior		275,000	
McLeods Channel, Lake Superior		1,025,000	
Mandan, Lake Medora			16,000
Manistique, Lake Michigan		150,000	
Marquette, Lake Superior		1,400,000	
Munising, Lake Superior		1,400,000	
North Point, Lake Huron		2,050,000	
North Point Reef, Lake Michigan		756,000	
Norwood Reef, Lake Michigan		756,000	
Ontonagon, Lake Superior		1,400,000	
Paris, Michigan Fish Commission	2,000,000		3,500
Petosky, Lake Michigan		756,000	
Point Iroquois, Whitefish Bay		700,000	
Sault Ste. Marie, Michigan Fish Commission	3,000,000		

a Lost in transit, 9,740 fry.

Details of Distribution of Fish and Fish Eggs—Continued.

LAKE TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Michigan—Continued.			
Scarecrow Island, Lake Huron		1,950,000	
Seven Mile Point, Lake Michigan		756,000	
Skilligallee Reef, Lake Michigan		1,512,000	
Tobins Harbor, Lake Superior			780,000
Washington Harbor, Lake Superior			660,000
Whitefish Point, Lake Superior		2,000,000	
Minnesota:			
Grand Rapids, Pokegama Lake			20,000
Little Falls, Lake Alexander			20,000
Montana:			
Helena, Lake Sewell			6,900
New York:			
Auburn, Owasco Lake		40,000	
Charity Shoals, Lake Ontario		450,000	
Cooperstown, Otsego Lake		40,000	
Dutch Point, Lake Ontario		100,000	
Fox Island, Lake Ontario		1,000,000	
Fulton Chain, Little Moose and Panther Lakes		32,000	
Grenadier Island, Lake Ontario		1,627,000	
Hayes Point, Lake Ontario		750,000	
McKeever, Bisby Chain of Lakes		24,000	
Point Peninsula, Lake Ontario		450,000	
Raquette Lake, Lake Kora	150,000		
Riverside, Schroon Lake		40,000	
Wilson Bay, Lake Ontario		100,000	
North Dakota:			
St. John, Lake Lindeman			20,000
Oregon:			
Haines, Rock Creek Lake		11,300	
Pennsylvania:			
Waterford, Lake Leboeff		17,500	
Vermont:			
Averill, Big Averill Lake		30,000	
Barnet, Harvey's pond		35,000	
Barton, Silver Lake		17,500	
Stone Pond		17,500	
Brandon, Lake Dunmore			3,370
Hardwick, Elligo Pond		15,000	
Orleans, Willoughby Lake		35,000	
Readsboro, Howe's pond		14,000	
West Burke, Newark Pond		17,500	
Wisconsin:			
Brule, Twin Lakes			10,000
Crandon, Dry Lake			12,000
Metonga Lake			12,000
Stone Lake			12,000
Haugen, Monday Lake		16,000	
New Auburn, Wisconsin Fish Commission			3,880
Oshkosh, Wisconsin Fish Commission	4,500,000		
State Line, Black Oak Lake			32,000
Stone Lake, Little Stone Lake		10,000	
Sand Lake		12,000	
Stone Lake		12,000	
Argentina:			
Buenos Aires, Argentine Government	50,000		
Total [a]	10,210,000	33,645,922	4,286,150

BROOK TROUT.

Arizona:			
Jerome, Beaver Creek			2,000
Dragoon Creek			2,000
Thompson Creek			2,000
West Fork Creek			2,000
Tucson, Sabino Creek			15,000
California:			
McCloud, Wheelers Creek		24,165	
Point Reyes, Paper Mill Creek	50,000		
Colorado:			
Antonito, Conejos River		20,000	
Basalt, Luna Creek		25,000	
Berrys Ranch, Eagle River			7,000
Black Hawk, Dory Lake		9,000	

[a] Lost in transit, 4,000 fry.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Colorado—Continued.			
Breckenridge, Crystal Lake		30,000	
Saw Mill Creek			4,500
Buena Vista, Cottonwood Creek		8,000	
Middle Cottonwood Creek		16,000	
South Cottonwood Creek		8,000	
Cebolla, Cebolla Creek			12,500
East Elk Creek			7,000
Cimarron, Cimarron River		35,000	
Silver Tip Lake		15,000	
Van Place Lake		15,000	
Colona, High Top Lake			5,100
Twin Lake			10,200
Wilson Lake			5,100
Colorado Springs, City Reservoir		30,000	
Glimmer Glass Lake		20,000	
Jimmy Camp Lake		27,500	
North Cheyenne Creek			6,000
Creede, Red Mountain Creek		10,000	
Rio Grande		10,000	
Sylvester's ponds		10,000	
Cripple Creek, Barnard Creek Pond			1,500
De Beque, Big Creek			8,500
West Bull Creek			6,800
Del Norte, Pinos River		10,000	
Delta, Alexander Lake		100,000	
Surface Creek		25,000	
Youngs Creek		100,000	
Denver, Crystal Springs Trout Hatchery		12,500	
Eldora, Lake Eldora		30,000	
Lake Kanawha		30,000	5,000
Frisco, Uneva Lake		40,000	
Georgetown, Green Lake		38,000	
Glenwood Springs, Hermitage Creek		25,000	
Mesa Creek		15,000	
Roaring Fork River		25,000	
Granby, East Inlet		12,000	
Grand Lake		24,000	
Grand River, North Fork		20,000	
Stillwater Creek		16,000	
Supply Creek		12,000	
Grand Junction, West Evacuation Creek		15,000	
Granger, Embargo Creek		12,500	
Graneros, Oak Lodge Ponds			3,000
Grant, Duck Lake		15,000	
Kirby Creek		15,000	
Gunnison, Bird Lakes			1,000
Hillside, Koch Branch		10,000	
Idaho Springs, Chinn Lake		15,000	
Edith Lake		50,000	
Saint Mary Lake		10,000	
Silver Lake		10,000	
Slater Lake		15,000	
Truesdale Creek		18,000	
Ivanhoe, Ivanhoe Creek		25,000	
Lyle Creek		15,000	
Jefferson, Rainbow Lake		15,000	
La Jara, Hamilton Ranch Pond		8,000	
La Jara River		19,950	
Pursley's pond		10,000	
Spring Creek		11,950	
Leadville, Arkansas River		39,000	
Austin's pond			40
Columbine Lake			2,000
Darrah's pond		20,000	
Half Moon Creek		24,000	
Lake Creek		24,000	
Laws Lake			20,000
Lower Twin Lakes		25,000	
Musgroves Pond		250,000	
Smith's ponds		20,000	
South Platte River		4,000	
Tennessee River		44,000	
Turquoise Lake		15,000	
Twin Lakes		25,000	
Upper Lake Creek		15,000	
Willow Creek		44,000	

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Colorado—Continued.			
Loveland, Big Thompson River, South Fork		30,000	
Big Thompson Pond		15,000	
Buckhorn Creek		15,000	
Lyons, Estes Park Hatchery	100,000		
Malta, Lake Creek		80,000	
Marshall, South Boulder Creek		30,000	
Minturn, Cross Creek			13,600
Eagle River			11,900
Gore Creek			10,200
Moffat, Artesia Pond			2,000
Monte Vista, Los Pinas Creek, Middle Fork		7,900	
Rock Creek		12,500	
South Fork Creek		16,000	
Montrose, Middle Spring Creek		10,000	
Spring Creek		15,000	
Nast, Frying Pan River		20,000	15,000
New Castle, Willow Creek			4,000
Norrie, Chapman Lake		15,000	
Olathe, Greys Creek		10,000	
Park Siding, South Platte River, North Fork		4,000	
Parlin, Quartz Creek			2,000
Parshall, Grand River		20,000	
Reads Lake		3,880	
Radium, Grand River		20,000	
Rico, Burnett Creek		10,000	
Ryman Creek		10,000	
Scotch Creek		15,000	
Ridgway, Dolores River		28,500	
Leopard Creek		15,000	
Rifle, Bear Creek			3,600
White River			1,800
Ruedi, Pond Creek		10,000	
Ruedi Lake		25,000	
Spearhead Lake			2,400
Salida, South Arkansas River		28,000	
Woodbridge Pond		40,000	
Sawpit, Sylvan Lake			6,700
South Fork, Beaver Creek		12,500	
Elk Creek		12,500	
Goupel Creek		12,500	
South Platte River			22,500
Trout Creek		12,500	
Steamboat Springs, Bear River		25,000	
Fish Creek		15,000	
Spring Creek		10,000	
Yampa River		15,000	
Texas Creek, Spruce Creek Reservoir			7,200
Thomasville, Spring Creek			2,400
Woods Lake		200,000	
Tolland, South Boulder Creek		23,000	
Trinidad, McWilliams Pond			4,000
South Lake			10,000
Twin Lakes, Lake Creek			5,000
Webster, Platte River			16,500
West Cliffe, De Weese Reservoir		98,000	
Venable Creek			10,800
Wheeler, Black Creek		15,000	
Wolcott, Eagle Creek			6,000
Wootton, Sugarite Creek			2,000
Connecticut:			
Botsford, Halfway River		12,000	
Danbury, Willow Brook			300
Greenwich, Byram River		8,000	
New Haven, Spring Glen Pond			300
Norwich, Billings Brook			400
Broad Brook			600
Choate Brook		7,500	
Pease Brook		7,500	
Stony Brook		7,500	
Saybrook Junction, Hart Brook			300
Stamford, Mill Creek		20,000	
Rippewan River		30,000	
Stratford, Brookdale Pond		12,000	
Tariffville, Three Cornered Pond		16,000	
Waterbury, Andrews Pond		32,000	
Hancock Pond		12,000	
Hop Brook		16,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Connecticut—Continued.			
Waterbury, Long Hill Brook		16,000	
Osborne Brook		8,000	
Potatuck River		8,000	
Wilton, Norwalk River		23,000	
Delaware:			
Wilmington, Brandywine Creek			4,000
Georgia:			
Rabun Gap, Denton Creek			2,400
Young Harris, Brasstown Creek			4,000
Idaho:			
Bancroft, Eighteenmile Creek			1,800
Blackfoot, Tanner Spring Lakes			1,200
Bonners, Spring Creek Pond			3,000
Buhl, Sand Spring Lake			1,000
Caldwell, Meyer Lake			900
Garner, Clifton Mill Pond			900
Hailey, Hartley Pond			900
Sheep Pond			900
Spring Creek			2,000
Hayden Lake, Hayden Lake			6,000
Jerome, Trail Springs			1,500
Kamiah, Little Duck Lake			2,000
Kingston, Pine Creek			6,000
Malad City, Waldon's pond			1,200
Montpelier, Mildred Pond			1,200
Naples, Fall Creek			4,500
Preston, Wilson Spring Pond			1,200
Rathdrum, Boeck Creek			1,500
Fish Lake Creek			2,000
Gilbert Creek			1,500
Lancaster Creek			2,000
Miller Creek			1,500
Rice Creek			1,500
Thorp Creek			2,000
Rexburg, Bell's pond			600
Illinois:			
Fox, Crystal Springs			300
Griggsville, Hatch Hollow Pond			300
Indiana:			
Angola, Clark Creek			1,950
Jackson Creek			2,000
Sauls Creek			1,950
Richmond, Henley Pond			1,000
St. Paul, Mill Creek			3,950
Iowa:			
McGregor, Bass Creek			6,000
Waukon, North Fork Creek			6,000
Patterson Creek			7,500
Kentucky:			
Compton Junction, Chimney Top Creek			10,000
Maine:			
Alfred, Nutter Brook			500
Annabessacook, Wilson Lake		30,000	
Belfast, Swan Lake		30,000	
Biddeford, Buzzell Brook		20,000	
Cold Spring Brook		15,000	
Runnells Brook		20,000	
Bingham, Pleasant Pond			1,800
Rowe Ponds		21,500	1,500
Bluehill, Woods Pond		25,000	
Brooks, Passachunkeag Pond		30,000	
Bryants Pond, Lake Christopher			1,500
Camden, Canaan Lake		30,000	1,500
Dedham, Green Lake		80,000	
Deering Junction, Bodge Brook		15,000	600
Machigonne Creek		15,000	750
Woodland Hatchery	25,000		
East Orland, Toddy Pond		21,000	
Ellsworth, Billings Pond		35,000	
Branch Pond		50,000	
Ellsworth Falls, Beach Hill Pond		20,000	
Floods Pond		25,000	
Long Pond		37,500	
Farmington, Beedy Brook			900
Big Island Pond			1,500
Cattle Brook			600
Chace Pond			1,500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maine—Continued.			
Farmington, Chain of Ponds			3,000
Dead River Pond			1,500
Grant Pond			1,500
Gull Pond			1,600
Lufkin Pond			1,500
Mt. Blue Pond			3,000
Redington Creek			1,500
Sandy River			1,500
Tufts Pond			1,400
Green Lake, Ducktail Pond		20,000	
Partridge Pond		25,000	
Snowshoe Pond		15,000	
Greenville Junction, Moosehead Lake			1,500
Harrington, Schoodic Lake		35,000	
Holeb, Little Pond			1,500
Jackman, Hatchery Brook		15,000	
Supply Pond		15,000	1,500
Thompson Brook		15,000	
Katahdin Iron Works, Big Houston Pond			1,500
Little Houston Pond		35,000	3,500
Kineo, Cany Creek		30,000	
Moosehead Lake		37,500	4,500
Lincoln, Long Pond		20,000	
Livermore Falls, Long Pond			1,500
Lowelltown, Bog Brook		12,500	
Deer Pond		12,500	
Lowell Pond		12,500	
Machias, Bog Lake		30,000	
Monmouth, Baker Pond			1,500
Jimmy Pond			1,500
Mosquito, Baker Pond		10,000	
Onawa, Upper Boarstone Pond		15,000	
Oquossoc, Rangeley Lakes			2,250
Otis, Green Lake		100,000	
Oxford, Hall Pond			1,200
Perry, Boyden Lake		40,000	
Phillips, Carlton Pond		37,500	
Philips Lake, Philips Lake		40,000	
Portage, Portage Lake			2,100
Rumford Falls, Howard Pond			1,500
Sedgwick, Thurston Brook			600
South Paris, Pennesseewassee Lake		17,500	
Shagg Pond			1,500
Washburn Pond		15,000	
Tunk Pond, Tunk Pond			1,500
Unity, Sandy Creek		30,000	
West Ellsworth, Pattens Pond		25,000	
West Paris, Abbot Pond			1,200
Little Concord Pond			1,500
Washburn Pond			600
Wilton, Webb Pond		17,500	
York Beach, Otter Pond			450
Maryland:			
Annapolis, Alcorn Branch			1,000
Bel Air, Barnes Run			2,000
Cool Spring Run			1,000
Durham's brook			500
Elbow Brook			1,000
Flint Mill Brook			1,000
Graveyard Brook			1,000
Hollands Brook			1,000
Johnson's brook			1,000
Stoner Creek			1,000
Wysong Brook			500
Deer Park, Altamont Pond			500
Block Run			400
Pond Run			500
Trout Run			800
Elkridge, Stony Run			1,000
Fallston, South Fork Brook			1,000
Glyndon, Lake Jorosa			500
Hagerstown, Marsh Run			1,000
Mill Spring Run			500
Highland, Heaps Brook			500
Minefield Brook			1,000
Ramsey Brook			1,000
Hutton, Crystal Lake			2,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maryland—Continued.			
Landover, Eccles Pond			500
Monkton, Curtis Brook			1,000
Matthews Branch			500
Patterson Brook			500
Phelps and Reynolds Branch			500
Mountain Lake Park, Pine Run			500
New Freedom, Ruhls Branch			1,000
Oakland, Cherry Creek			1,500
Deep Creek			2,200
Dunker Lick Creek			1,800
Hamill's lake			1,000
Harrington Creek			2,300
Harvey's pond			320
Millers Run			1,800
Wilsons Lake			500
Rockland Station, Green Springs Run			1,000
Ruxton, Rockland Creek			1,000
Sharon, Magnes Brook			500
Smithsburg, Oswald Run			500
Silver Falls Creek			500
Warner Gap Run			500
Stoyer, Sand Run			400
Thurmont, Hunting Creek			1,500
Westminster, Fairview Pond			500
Wilson, Laurel Run			1,500
Massachusetts:			
Athol, Swift River		20,000	
Clinton, Nashua River			600
Concord, Punkatasset Pond		16,000	
Fitchburg, Lord Brook			600
Mulpus Brook			900
Greenfield, Fisk Pond			500
Groton, Hunkerty Brook			600
Holyoke, Man Han River			700
Williamsett Brook			300
Lawrence, Schubert's pond		4,000	
North Adams, Hoosac River, North Branch			500
Hudson Brook			500
Northampton, Running Gutter Creek			700
South Hanson, Poors Creek		12,000	500
Tolland, Slocum Brook			1,200
Waltham, Pequod Brook		8,000	
School House Brook		8,000	
Westfield, Big Powder Mill Brook			500
Farmington River, East Branch			1,400
Little River			700
Powder Mill Brook			500
Weston, Draper Brook			300
West Townsend, Allison's pond			180
Williamsburg, Clary Pond			300
Highland Brook			300
Michigan:			
Addison, Posy Creek			3,000
Alger, Bear Creek		5,000	
Wells Creek		10,000	
Alpena, Davis Creek		12,000	
Newton Creek		9,000	
Watson Creek		9,000	
Widner Creek		12,000	
Baldwin, Baldwin Creek		15,000	
Battle Creek, Sevenmile Brook			3,000
Bellaire, Shanty Creek			3,000
Biteley, Marquette River			3,000
Branch, Weldon Creek		10,000	
Brighton, Ore Creek		12,000	
Calumet, Eagle Creek			6,000
Mosquito Creek			4,000
Central Lake, Central Lake Brooks			3,000
Clare, Tobacco River, North Branch		18,000	
East Tawas, Vaughn Creek			1,000
Gladwin, Cedar River		15,000	
Smith Creek		10,000	
Grand Marais, Grand Marais Creek			10,000
Greenville, Berridges Creek			2,000
Hale, Hale Creek		9,000	
Smith Creek		9,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Michigan—Continued.			
Hillsdale, Kirby Brook			3,000
Holland, Half Way Creek		6,000	
Interlochen, Betsie River			3,000
Kalamazoo, Haden Brook		15,000	
Silver Creek		12,000	
Kingsley, Boardman River			2,000
East Creek			2,000
Mayfield Brook			2,000
Little Manistee, Little Manistee River		20,000	
Lovells, Au Sable River, North Branch		25,000	
Big Creek		20,000	
Crapo Creek		10,000	
Mandan, Montreal River			6,000
Millersburg, Indian Creek		12,000	
Little Ocqueoc River		15,000	
Ocqueoc River		15,000	
Muskegon, Cedar Creek		12,000	
Silver Creek		9,000	
Newaygo, Bigton Creek		12,000	
Northville, Townsend Creek		10,000	
Peacock, Au Sable River			3,000
Manistee River			10,000
Petersburg, Crystal Pond			6,000
Phoenix, Gratiot River			6,000
Roscommon, Barnes Creek		5,000	
Beaver Creek		5,000	
Cedar Creek		5,000	
Cold Creek		15,000	
Durant Creek		10,000	
Willow Creek		5,000	
Standish, Lundy Creek			6,000
Sweetwater, Sweetwater Creek			4,000
White Cloud, White River			4,000
Wingleton, Bowman Creek			4,000
Cedar Creek			4,000
Danahar Creek		15,000	
Minnesota:			
Alborn, Ericsson Creek			600
Beaver Crossing, Beaver Creek			10,000
Budd Creek			4,000
Little Split Rock River			4,000
Split Rock River			9,200
Split Rock River, East Branch			6,000
Canton, Weisel Creek			5,300
Carlton, Otter Creek			10,000
Cloquet, Otter Creek			6,000
Squaw Creek			6,000
Deephaven, Jennison Creek			900
Kokesh Creek			2,000
Duluth, Endion Brook			12,000
Lester Creek, East Branch			6,000
Temperance River			1,200
Fond du Lac, Mission Creek			4,000
Fosston, Poplar Lake			10,000
Hibbing, O'Brien Brook			800
Hovland, Upper Brule River			7,500
Knife River, Micmac Lake			10,000
Mountain Brook			6,000
Nigadoo Brook			4,000
Lewiston, Enterprise Creek			2,000
Gunther Valley Creek			600
Hemmingway Creek			2,400
Laufenbergs Valley Creek			400
Pine Creek			2,000
Rush Creek			2,400
Stockton Valley Creek			2,000
Whitestone Creek, Middle Branch			600
Whitewater Creek, South Branch			2,800
Little Falls, Hillman Creek			10,000
Okesippi Creek			8,000
Skunk Creek			10,000
Minnesota City, Bear Creek			2,000
Rollingstone Creek, North Branch			2,000
Rollingstone Creek, Rupprecht Valley Branch			2,000
Preston, Bear Creek			2,000
Camp Creek			2,000
Forestville Creek, North Branch			1,000
Forestville Creek, South Branch			2,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Minnesota—Continued.			
Preston, Partridge Creek			1,000
Sugar Creek			1,500
Watson Creek			2,000
Redwood, Schmidts Creek			400
Rochester, Bear Creek			1,000
Rollins Siding, Bates Creek			4,000
Pine Creek			4,000
Rushford, Big Spring Creek			1,000
Camp Creek			1,000
Choice Creek			1,000
Coolidge Creek			1,000
Dalleys Creek			1,000
Diamond Creek			1,000
Ensend Creek			1,000
Enterprise Creek			1,000
Ferguson Creek			1,000
Gribbin Creek			1,000
Hemingway Creek			1,000
Iverson Creek			1,000
Jansens Creek			1,000
Johnson Creek			1,000
Meade Creek			1,000
Onstine Creek			1,000
Opheim Creek			1,000
Overland Creek			1,000
Paterson Creek			1,000
Pine Creek			1,000
Tangen Creek			1,000
Voagen Creek			1,000
Wilson Creek			1,000
Wiscoy Creek			1,000
Saginaw, Demsey Creek			4,000
St. Charles, Campbells Spring Branch			1,000
Carters Run			1,500
Crows Creek			1,500
Drakes Creek			1,000
Fays Run			1,000
Logan Branch			400
Nichols Spring Branch			400
Pine Creek			2,000
Trout Run			2,000
Whitewater River			6,000
Savage, Nine Mile Creek			4,500
Two Harbors, Encampment River			800
Winona, Big Pickwick Creek			400
Cedar Creek			1,400
Corey Valley Creek			1,000
Dabelstein's ponds			800
East Burns Valley Creek			400
Ferguson Creek			400
Gilmore Valley Creek			1,000
Harvey Valley Creek			1,000
Hicks Valley Creek			1,600
Laufenberger Creek			1,000
Little Pickwick Creek			600
Marey Creek			1,000
Middle Valley Creek			400
Nunny Coulee Creek			600
Pine Creek			600
Pleasant Valley Creek			1,000
Rollingstone Creek			1,000
Rupprecht Valley Creek			600
Speltz Valley Creek			1,400
Straight Valley Creek			1,000
West Bruce Valley Creek			2,000
West Burns Valley Creek			400
Wiscoy Creek			1,000
Missouri:			
St. Joseph, Missouri Fish Commission	100,000		
Montana:			
Alder, Moran Pond			1,200
Anaconda, Warm Springs Creek			2,800
Warm Springs Pond			1,600
Basin, Cataract Creek			22,500
Belt, Little Belt Creek			3,500
Belton, Fish Creek			2,000
Big Timber, Big Timber Creek			12,000
Boulder, Buffalo Creek			2,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Montana—Continued.			
Bozeman, Beaver Creek			4,000
Bridger Creek			36,000
Kelly Creek			2,000
Butte, Canty's pond			2,000
Nez Perce Pond			2,000
White's lake			6,000
Chinook, Clear Creek			3,500
Columbus, Deep Creek			15,000
East Rosebud Creek			18,000
Fishtail Creek			1,500
Little Rosebud Creek			1,500
Skeleton Creek Pond			2,000
Spring Creek			2,000
Stillwater River			2,000
Crabtree, Spring Creek			1,500
Deer Lodge, Dog Creek			3,500
Dillon, Carter Creek			1,800
Landons Creek			600
Murray Spring Creek			4,000
Poindexter Creek			1,800
Dodson, Lodge Pole Creek			5,500
Emigrant, Dailey Lake			2,000
Helena, Papoose Creek			7,500
Hobson, Crescent Pond			2,000
Galbreath Coulee Lake			2,000
Lennep, Comb Creek			9,000
Lewistown, Arnell Creek			4,000
Box Elder Creek			4,000
Flat Willow Creek			3,000
Lima, Little Sheep Creek			1,500
Livingston, Holliday Spring Creek			9,000
Moore, Jones Spring			3,000
Sheridan, Branham Lake			2,800
Straw, East Buffalo Creek			9,000
Toston, Spring Creek Lake			7,500
Victor, Bear Creek			5,000
Big Creek			5,000
Sweathouse Creek			5,000
White Pine, Little Beaver Creek			2,000
Spring Lake			1,500
Winston, Staubach Creek			4,000
Nebraska:			
Chadron, Bordeaux Creek			15,000
Dead Horse Creek			30,000
Creighton, Bayile Creek			600
Nevada:			
Reno, Truckee River			3,600
New Hampshire:			
Ashland, Squam Lake		16,000	
Berlin, Chickwelnepy Creek		30,000	
Munn Pond		40,000	
Success Pond		40,000	
Bradford, Mountain Brook		12,000	
Campton, Bee Bee River		20,000	
Charlestown, Benware Brook			1,500
Hassom Brook			1,500
Mill Brook			1,500
Concord, Black Brook		8,000	
Bon Bog Brook		12,000	
Bow Brook Pond		8,000	
Bridge Brook		4,000	
Brown Brook		8,000	
Bumfogen Brook		16,000	
Deer Meadow Brook		8,000	
Monument Brook		8,000	
Pickard Brook		8,000	
Pine Island		12,000	
Trap Brook		12,000	
Enfield, Lovejoy Brook		12,000	
Epsom, Mountain Brook		8,000	
Exeter, Meadow Brook			180
Grafton, Wildmeadow Pond			220
Greenville, Shattuck Brook			180
Halcyon, Tilton Brook		6,000	
Keene, Alstead Brook		16,000	
Ashuelot River, East Branch		20,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New Hampshire—Continued.			
Laconia, Follett Brook		6,000	
Gilford Brook		12,000	
Lebanon, Cranberry Pond		8,000	
Lisbon, Star Crescent Pond		20,000	
Madison, Silver Lake		5,000	
Manchester, Dalton Brook			180
Manter Brook		12,000	
Nigger Creek		8,000	
Prescott Brook			180
Nashua, Budro Brook		6,000	
Chase Brook			180
Cider Mill Brook		8,000	
Gibson Brook		12,000	
Newbury, Lake Sunapee			6,000
New London, Barber Brook		6,000	
Newport, Cutts Brook			1,000
Penacook, Brickyard Brook		6,000	
Tannery Brook		6,000	
Peterboro, Nay Brook		12,000	
Pike, Eastman Brook			500
Plymouth, Little Glen Ponds		48,000	
Portsmouth, Marston Brook		8,000	
Peverly Brook			250
Potter Place, Fellows Meadow Brook		6,000	
Raymond, Fordway Brook			180
Jose Dudley Brook			180
Pine Hill Brook			180
Scribner Brook			180
Sanbornville, Pike Brook		16,000	
South Brookline, Rockwood Pond		8,000	
South Lyndeboro, Herrick Brook			180
Warner, Meadow Mills Creek		8,000	
Stevens Hill Creek		12,000	
Wentworth, Baker River		8,000	
Wilton, Miller Brook		12,000	
Purgatory Brook		16,000	
Stony Brook		12,000	
Winchester, Willard Pond			1,000
Wolfeboro, Haith Brook		12,000	
New Jersey:			
Elberon, Whalepond Brook			1,000
Passaic, McDaniels Brook			1,000
Pattenburg, Manunselocwa Creek			1,000
Pompton Lakes, Haycock Brook			1,000
Princeton, applicant	1,000		
Salem, Collins Run			1,500
Cool Run			1,500
Easter Run			1,500
South Ogdenburg, Kinney Brook			500
Sparta, Pullis Stream			500
Sherman Mine Brook			500
New Mexico:			
Alamogordo, Spring Canon Pond			5,000
Glorieta, El Reto de la Arrhaw			2,000
Las Vegas, Sapello River			4,000
Santa Fe, Rio Grande Live Stock Co.'s lake			2,000
Rio del Medio Creek			3,200
Santa Fe River			2,000
Tesuque Creek			2,000
Silver City, Glenwood Pond			4,000
Glenwood Springs			5,000
Wagon Mound, Tison Creek			1,600
New York:			
Adams, South Sandy Creek		24,000	
Afton, Cady Creek			500
Cornell Creek			500
North Afton Brook			1,000
Pixly Brook			1,000
Altmar, Beaver Dam Brook		12,000	
Potts Mill Brook		16,000	
Salmon River		24,000	
Apulia Station, Cascade Brook			1,500
Cold Brook			500
Conklin Brook			1,000
Dodge Brook			1,500
Gallinger Brook			600
Gleason Brook			1,000

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New York—Continued.			
Apulia Station, Grady Brook			600
Johnson Brook			6,000
June Brook			1,500
Keeler Brook			1,000
Lee Brook			1,000
Newman Brook			1,000
Osborne Brook			1,000
Auburn, North Brook		20,000	
Salmon Brook		24,000	
Sennett Brook		20,000	
Barneveld, Big Drumlin Pond		12,000	
Beaver River, Beaver River		12,000	
Twitchell Creek		24,000	
Bellport, Osborne Creek			500
Berlin, Little Hoosick River		16,000	
Bliss, Wiscoy Creek		16,000	
Wiscoy Creek, North Branch		8,000	
Blossvale, Fish Creek		20,000	
Brainard, Black Brook		8,000	
Budlong Brook		6,000	
Buffalo, New York State Cancer Laboratory			250
Cambridge, Blair Brook		12,000	
Pammanook Creek		8,000	
Rice Brook		8,000	
Canton, Baldwin Brook		8,000	
Buck Brook		8,000	
Clark Brook		8,000	
Dean Brook		8,000	
Giffin Brook		8,000	
Granis Brook		6,000	
Howard Brook		8,000	
Leonard Brook		16,000	
Little River		16,000	
McFadden Brook		12,000	
Pleasant Brook		8,000	
Taylor Brook		12,000	
Cattaraugus, Cattaraugus Creek, West Branch		12,000	
Central Bridge, Grosvenor Pond			500
Cincinnatus, Brakel Creek			1,500
Cooperstown, Iroquois Farm Ponds			600
Corinth, Sturdevan Brook		12,000	
Cornwell, Mineral Spring Creek			1,000
Dryden, Virgil Creek			1,500
Edmeston, Wharton Creek			2,000
Floodwood, Ledge Pond		24,000	
Georgetown Station, Gladding Brook			500
Mann Brook			1,000
Mariposa Creek			1,000
Middletown Creek			1,000
Plank Creek			600
Thompson Brook			600
Greene, Crandall Brook			1,000
Highland Falls, Queensboro Creek			1,500
Hoosick Falls, Case Brook		8,000	
Shingle Hollow Creek		12,000	
White Creek		16,000	
Iona Island, Doodletown Brook			1,000
Livingston Manor, Beaverkill River		10,000	
Elmore Lake		7,500	
Mahopac, Hillsboro Lake			2,500
Marathon, Hunts Creek			1,000
Merrills Creek			1,500
Newark, Military Brook Pond		8,000	
New Lebanon, Burnemead Brook		6,000	
Church Brook		6,000	
Cold Spring Brook		6,000	
Gillett Brook		8,000	
Hosmer Brook		8,000	
Hull Brook		8,000	150
Lost Brook		8,000	
Mahar Brook		6,000	
Meadow Brook		8,000	
Meander Brook		4,000	
Parker Brook		8,000	
Queechy Road Brook		8,000	
Shaker Mill Brook		16,000	150
Thomas Brook			150

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New York—Continued.			
New Lebanon, Tilden Brook			150
West Meadow Brook		8,000	
Wyomonock Creek			500
New York, New York Aquarium	10,000		
Northville, Barkers Stream		16,000	
Onativia, Hiscock Brook			1,000
Kennellys Brook			1,000
Morgan Brook			2,000
Montgomery Brook			1,000
Oneonta, Butternut Creek			2,500
Otsego Creek			1,500
Ouleous Creek			2,000
Otego, Otsdawa Creek			1,000
Paul Smiths, Lower St. Regis Lake		18,000	
Patterson, Croton River			2,500
Quaker Brook			2,500
Prospect, Big Rock Lake		24,000	
Randolph, Little Conewango Creek		16,000	
Rome, Canada Creek		16,000	
Point Rock Creek		16,000	
Roscoe, Abewood Brook		5,000	
Appley Brook		5,000	
Beaverkill River		7,500	
Berry Brook		6,000	
Darbee Brook		5,000	
Shin Brook		5,000	
Stewart Brook		5,000	
Tennanah Lake		10,000	
Willowemoc River		13,500	
Salamanca, Stoddards Pond		8,000	
Saugerties, Dwaskill Creek			2,000
Swartzwood, Jackson Hollow Creek			1,800
Syracuse, Carpenter Brook		16,000	
De Montforde Creek		8,000	
Thurman, Millington Brook		8,000	6,000
Veli Pond		20,000	
Valley Stream, Trout Lake			1,000
Watertown, French Creek		4,000	
Kings Creek		4,000	
Knapp Creek		6,000	
Waterville, Oriskany Creek		8,000	
Townsend Creek		10,000	
Williamstown, Carterville Pond		24,000	
Willsboro, Warm Pond		24,000	
North Carolina:			
Addie, Scotts Creek			3,200
Apalachia, Cane Creek			4,800
Sular Creek			4,000
Balsam, Dark Ridge Creek			1,600
Woodfin Creek			1,600
Black Mountain, Long Branch Creek			500
Middle Fork Creek			1,000
Montreat Lake			2,500
Silver Fork			2,000
Sugar Creek			1,000
Swannanoa River, North Fork			2,000
Boonford, Ayles Creek			1,500
Cane River, Elk Fork			1,000
Brevard, Middlesex Branch			4,000
Craggy, Wells's pond			800
Dillsboro, Brushyfork Creek			1,600
Elk Park, Elk River			2,400
Hickory Creek			2,400
Winkler Creek			6,400
Glenwood, Goose Creek			500
Mashburn Creek			500
Greenlee, Bear Creek			1,000
Bobs Fork Creek			1,000
Graybeard Creek			1,000
Greenlee Fork Creek			1,000
Haw Branch			1,000
Huskins Creek			1,000
Jarretts Creek			1,000
Little Shoals Creek			1,000
Logan Creek			500
Lone Fork Creek			500
Mountain Creek			1,000
Nahlets Creek			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
North Carolina—Continued.			
Greenlee, Pool Creek			500
Rock House Creek			500
She Bear Creek			1,000
Simmons Creek			1,000
Still House Creek			500
Teamster Creek			500
Thompson Fork Creek			1,000
Wild Cat Falls Creek			1,000
Wolf Creek			1,000
Hendersonville, Foley Creek			3,200
Kellerville, Beech Creek			14,000
Buckeye Creek			10,000
Linville Falls, Catawba River, North Fork			2,000
Green Mountain Branch			500
North Cove Creek			1,500
Pine Branch			500
Marion, Bee Rock Creek			1,000
Chalk Brook			500
Fourmile Creek			1,000
Garden Creek			1,000
Georges Creek			1,000
Greasey Creek			500
Honeycutte Creek			1,000
Jake Creek			1,000
Limekiln Creek			1,000
Little Buck Creek			1,000
Lost Cove Creek			1,000
Mill Creek			1,000
Osborne Creek			1,000
Paxton Creek			1,000
Rag Creek			1,000
Stott Creek			500
Minneapolis, Little Horse Creek			1,600
Montezuma, Deep Gap Branch			2,400
Emmonds Creek			2,400
Kawana Lake			4,000
Linville River			4,800
Stepup Branch			1,600
West Fork Creek			3,200
Penland, Brush Creek			1,000
Penrose, Brier Creek			2,400
Crab Creek			3,200
Grassy Creek			2,400
Laurel Creek			2,400
Little River			3,200
Reasonover Creek			2,400
Shoal Creek			2,400
Staghorn Creek			2,400
Racford, Pasture Branch			1,600
Toecane, Cane Creek			500
Club Creek			500
Hine Creek			500
Tomotla, Coloards Creek			3,200
Hayes Mill Creek			3,200
Waynesville, Balsam Spring Branch			1,600
Bennett Branch			1,600
Brindle Creek			1,600
Caldwell Fork Creek			1,600
Catatuchee Creek			3,200
Francis Branch			3,200
Hemlock Pond			3,200
Hyatts Branch			1,600
Indian Creek			1,600
Jaynes Branch			1,600
Jonathan Creek			3,200
Locust Grove Run			1,600
Long Branch			1,600
Loves Branch			1,600
Nick Creek			1,600
Pigeon River, Grassy Fork			1,600
Pigeon River, Middle Fork			1,600
Shelton Cove Creek			1,600
Ugly Creek			1,600
Whittier, Conley Creek			1,600

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Ohio:			
Bellefontaine, Macochee Creek			4,000
Spring Branch			3,000
Cleveland, Canyon Spring			2,000
Mansfield, Golf Spring Run			3,000
Mercer Creek			4,000
Mercer Lake			2,000
Niles Run			3,000
Reynolds Run			3,000
Ravena, Spring Creek			3,000
Urbana, Powells Brook			3,000
Oklahoma:			
Carrier, Spring Bark Creek			600
Weatherford, Deer Creek			400
Oregon:			
Baker City, Daly Creek		5,000	
Duncan, Meacham Creek		4,000	
Gibbon, Umatilla River		4,000	
Hilgard, Spring Creek		3,000	
Milwaukee, Crystal Lake		15,000	
Oregon City, Abernethy River		10,000	
Clear Creek		5,000	
Rock Creek Pond		9,000	
Woodcock River		9,800	
Pennsylvania:			
Allentown, Cedar Creek			3,000
Altoona, Big Laurel Run			500
Burgoon Run			500
Chondrius Run			500
Demmaree Run			500
Figarts Run			500
Green Springs Run			500
Juniata Gap Run			500
Laurel Run			500
Mill Run			500
Neb Run			500
Sandy Run			500
Arcadia, Powell's pond			500
Auburn, Bear Creek			1,200
Gold Mine Creek			1,000
Stony Creek			2,500
Austin, Bailey Run			1,000
Bark Shanty Run			500
Big Moores Run			1,000
Birch Run			1,000
Berg Run			1,000
Cowley Run			1,000
Darwin Run			1,000
East Fork Creek			1,000
Freeman Run			1,000
Hammersley Run			1,000
Jones Run			1,000
Little Nelson Run			1,000
Nelson Run			1,000
Portage Creek			1,000
Prouty Run			1,000
South Fork Run			1,000
South Woods Creek			1,000
Wild Boy Run			1,000
Bellefonte, Fulmers Run			1,500
Spring Run			3,000
Belleville, Kishacoquillas Creek			1,500
Kishacoquillas Creek, South Fork			2,000
Bellwood, Logan Spring Pond			500
Benton, Banks Run			1,000
Belles Run			1,500
Benjamin Run			500
Colley Brook			500
Fair Brook			500
Fishing Creek			1,000
Gallas Run			500
Hess Run			1,000
Hickory River			1,000
McHenry Run			500
Raven Creek			2,000
Wiles Run			1,000
Wynona Brook			500
Berlin, Laurel Run			2,000
Birdsboro, Molasses Pond			300

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Bloomsburg, Crouse Run			500
Brandonville, Torbert Run			600
Davis Run			1,200
Bridgeton, Wises Run			500
Bushkill, Bushkill Creek			2,000
Carrolltown Road, Ahles Run			500
Bash Run			500
Bearer Run			500
Boslet Run			500
Davis Run			500
Edwards Run			500
Farabaugh Run			500
Flemings Run			500
Flick Run			500
Griffith Run			500
Kane Run			500
Kirk Run			500
Lauer Run			500
Meisels Run			500
Mohler Run			500
Owens Run			500
Reese Run			500
Shettig Run			500
Snyder Run			500
Springer Run			500
Thomas Run			500
Tudor Run			500
Williams Run			500
Centerbridge, Rodgers's pond			500
Central, Beaver Run			500
Davis Brook			500
Jones Brook			500
Stony Brook			500
Chambersburg, Birch Run			4,000
Carbaugh Run			2,500
Hoosic Run			2,500
Cherry Run, Penns Run			375
Cherry Tree, Shryock Run, North Branch			500
Clarendon, Elk Run			1,000
Six Mile Creek			1,000
Wild Cat Creek			1,500
Clearfield, Cold Run			1,000
Lick Run			1,000
Moose Creek			1,000
Morgan Run			1,000
Stone Run			1,000
Trout Run			1,000
Coburn, Donners Deich Run			500
East Elk Creek			1,000
Elk Creek			1,000
Philips Creek			1,000
Rough Run			500
Spring Run			500
Turpentine Creek			1,000
West Elk Creek			1,000
Cold Springs, Pine Swamp Run			1,200
Coles Creek, Black Ash Run			500
Coudersport, Allegheny River			1,000
Big Morco Run			1,000
Lyman Run			1,000
Mill Creek			1,000
Pine Creek			1,000
Prouty Creek			1,000
Sinnamahoning Creek, South Branch			1,000
Crandalltown, Long Run			1,200
Cresco, Broadhead Creek			2,000
Buck Hill Creek			1,500
Honnet Hill Creek			1,000
Mill Creek			1,000
Rattlesnake Creek			1,000
Stony Run			1,500
Cresson, Clearfield Creek			1,000
Three Spring Run			500
Winterset Run			500
Daylesford, Darby Creek			500
Delta, Knell Run			1,000
Mine Run			1,000
Samples Run			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Downingtown, Dallin Run			2,000
Davis Run			2,000
Glen Isle Run			500
Rock Run			2,000
Dubois, Big Anderson Creek			2,000
Ebensburg, Abrams Run			500
Bash Run			500
Blacklick Creek			500
California Run			500
Clear Spring Run			500
David Evans Pond			500
Davis Creek			500
Factory Run			500
Farren Brook			500
James Run			500
Jones Creek			1,000
Kirschner Run			500
Laurel Branch			500
Lloyds Run			500
Noel Run			500
Roberts Run			500
St. James Run			500
Sakarak Run			500
Smith Run			500
Stewarts Run			500
Tudor Run			500
Williams Run			1,000
Ellenton, Rock Run			2,000
Emporium, Cooks Run			1,000
Crooked Run			500
East Cowley Creek			1,000
North Creek			1,000
Parker Creek			1,000
Salt Run			2,000
Sinnamahoning Creek			1,000
West Cowley Creek			1,000
Farrandsville, Lick Run			2,800
Fern Glen, Big Tomhicken Creek			600
Crooked Run			1,000
Roberts Run			1,000
Sand Spring Run			1,000
Fishing Creek, Fishing Creek			1,500
Martin Run			500
Forks, Huntingdon Creek			2,500
Little Pine Creek			1,000
Fort Washington, Kennedy's pond			400
Frackville, Crystal Creek			600
Little Mahanoy Creek			1,800
Tower Run			1,000
Frazer, Pigeon Run Pond			500
Glen Iron, Penns Run			1,125
Grays Run, Grays Run			1,800
Long Run			1,800
Yoder Run			1,000
Yoxtheimer Run			600
Greencastle, Willow Brook			1,000
Hawley, Wallen Paupac River			1,500
Hellam, Locust Run			1,000
High Rock, Livingston Run			500
Lockport Run			500
Tom Creek			1,000
Hollidaysburg, Blairs Creek			1,000
Honesdale, Baker Brook			500
Bates Creek			500
Big Creek			1,000
Bramms Pond			500
Calkins Creek			500
Dyberry Creek			1,000
Fivemile Creek			500
Gageis Brook			500
Haines Brook			500
Kreglers Creek			500
Lackawaxen River			1,000
Lackawaxen River, North Branch			1,000
Middle Creek			1,000
Mitchell Creek			500
Old Log Cabin Creek			1,000
Paynter Brook			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Honesdale, Rattlesnake Creek			1,000
Rout Creek			500
West Branch			1,000
Hopewell, Beaver Creek			2,000
Otts Run			500
Three Spring Run			500
Yellow Creek			1,000
Howard, Lick Run			500
Hughesville, Muncy Creek			3,000
Huntingdon, Mill Creek			1,000
Stone Creek			1,500
Trough Creek			1,500
Jamison City, Bloody Run			1,000
Grassy Hollow Run			1,000
Haugh Run			500
Jersey Shore, Larrys Creek			2,400
Keating Summit, Brown Hollow Creek			500
Cowley Run			1,000
Indian Run			500
Portage Creek			1,000
Spring Creek			500
Knoxville, Troups Creek			1,500
Lancaster, Furnace Run			1,000
Middle Creek			1,000
Silver Run			1,000
Steinmans Run			1,000
Walnut Run			1,000
Landerberg, White Clay Creek, West Branch			500
Lanesboro, Brushville Creek			500
Canawacta Creek			1,000
Cascade Creek			1,000
Cold Spring Brook			1,000
Dodges Creek			500
Drinker Creek			1,000
Egypt Creek			1,500
Hemlock Creek			2,000
Roaring Brook			500
Wild Cat Brook			1,000
Laquin, Little Schrader Creek			1,800
Laubach Station, Hess Run			500
Longs Brook			500
Savage Brook			500
Laughlintown, McMullen Run			1,000
Lebanon, Tulpehocken Creek			1,000
Lehighton, Spring Brook			600
Lemont, Cedar Creek			500
Furnace Run			500
Hublers Gap Run			500
Laurel Run			1,000
Pine Swamp Run			500
Spring Creek			1,500
Lenover, Weavers Run			500
Lewisburg, Laurel Run			1,500
Rapid Run			1,500
White Deer Creek			1,500
Lilly, Bear Rock Creek			500
Dunn Creek			500
Hughes Spring Pond			500
Laurel Run			500
McTamany Run			1,000
Lock Haven, Bagley Run			500
Birds Run			1,200
Brewer Run			500
Castenea Run			1,200
Cherry Run			500
Chriss Faust Run			1,400
Clarks Run			500
Considines Run			700
Craig Run			500
Deise Run			1,200
Eady Run			500
Earon Run			500
Eckers Run			500
Ferney Run			500
Fogarty Run			700
Goulds Run			500
Grows Run			500

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Lock Haven, Halls Run			1,400
Hanna Run			500
Harlens Run			1,400
Harveys Run			1,200
Heaveners Run			700
Hurds Ruu			500
Jerry Run			500
Johnson Run			500
Kamp Run			1,200
Kirbys Run			1,200
Kissell Run			1,800
Little Bagley Run			500
Little Plum Run			500
Little Sugar Valley Run			1,200
Lloyds Run			700
Lucas Run			1,200
Lusk Run			500
McCloskey Run			500
McElhattan Creek			2,400
McKagnes Run			1,200
Martins Run			1,200
Mill Run			500
Mitchell Run			500
Moganhans Run			1,200
Muncher Run			700
Musters Run			1,200
North Fork Run			500
Packer Run			500
Pine Bottom Run			1,200
Plum Run			500
Queens Run			500
Quiggles Run			1,200
Ram Hollow Run			500
Reed Ruu			500
Rickers Run			1,400
Rock Run			700
Shadles Run			1,400
Shingle Hollow Run			500
Slab Run			500
South Fork Run			500
Spring Run			700
Sugar Run			500
Totanhorn Run			1,400
Tyler Run			500
Welsh Run			500
Wetzells Run			700
Widmans Run			500
Wiener Run			1,200
Wild Run			500
Winber Run			500
McElhattan, Bixler Run			700
Chathams Run			2,100
Comerdner Run			1,200
Jemersons Run			700
Little Chathams Run			1,200
Lucas Run			1,200
McElhattan Run			700
Motter Run			1,200
Nolans Run			700
Russells Run			700
Spring Run			700
Mahanoy City, Stony Run			600
Mansfield, Griffin Creek			3,000
Marienville, Bear Pen Run			500
Big Salmon Creek			1,500
Blue Jay Creek			1,000
Brush Creek			500
Centennial Run			500
Cherry Creek			500
Coleman Run			1,000
Crosman's pond			500
East Cherry Creek			500
East Millstone Creek			1,000
Guston Run			500
Hall's pond			500
Huling Run			500
Jakes Run			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Marienville, Maple Creek			1,000
North Salmon Creek			1,000
Six Mile Run			500
Truby Run			500
Warner Run			500
West Millstone Creek			2,000
Wild Cat Run			500
Marklesburg, Touse Run			500
Marsh Hill, Frozen Run			1,500
Maston, Pigeon Run			1,000
Pleasant Stream			2,000
Smith Run			1,000
Mauch Chunk, Bear Creek			600
Big Bear Creek			1,000
Drakes Creek			1,000
Glen Run			600
Heydst Run			600
Hickory Run			1,000
James Run			1,000
Keipers Run			600
Mauch Chunk Creek			1,000
Mud Run			1,500
Panther Creek			600
Pine Run			1,000
Robinsons Run			600
Ruddles Run			600
Sand Spring Run			500
Stony Creek			1,000
Wild Creek			1,000
Yellow Run			1,000
Mayport, Pine Run			2,000
Meadville, Berley Run			1,000
Brawley Run			500
Hamilton Run			1,000
Little Sugar Creek			1,000
Spring Run			1,000
Middleport, Cold Run			1,000
Mifflinburg, Brush Hollow Run			500
Buffalo Creek			1,500
First Gap Run			500
Fourth Gap Run			1,500
Halfway Gap Run			500
Hays Gap Run			500
Lukers Gap Run			500
Pine Swamp Creek			1,000
Rapid Run			1,500
Reeds Gap Run			500
Sand Run			500
Second Gap Run			500
Spruce Run			1,000
Third Gap Run			1,000
Yankee Run			500
Mifflintown, Big Run			1,500
East Lost Creek			1,500
Hornings Run			1,000
Sponhowers Run			1,000
Tennis Run			500
West Lost Creek			1,500
Millville, Bear Run			1,000
Milroy, Laurel Run			1,500
New Lancaster Stream			1,500
Mt. Joy, Big Spring Creek			500
Mt. Pocono, Wilson Spring Run			500
Mt. Union, Carters Run			500
Scrub Gap Run			1,000
Singers Gap Run			1,000
Muncy, Muncy Creek			2,500
New Freedom, Codorus Creek			1,000
Summitt Creek			500
New Holland, Goods Run			500
New Ringgold, Beaver Creek			600
Cold Run			600
Rausch Creek			1,000
Newton Hamilton, Licking Creek			1,000
Long Hollow Run			500
Nigger Creek			1,000
Orangeville, Achenbach Run			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Osceola Mills, Bear Run			2,000
California Run			2,000
Coal Creek			2,000
Flat Rock Creek			2,000
Mountain Creek			2,000
Trout Run			2,000
Paddy Mountain, Penns Run			2,625
Palm, Indian Creek			1,000
Parkersburg, Octorara Creek			1,500
Parsons, Bear Creek			1,500
Meadow Run			1,000
Pond Creek			1,000
Ten Mile Run			1,000
Patton, Carroll Creek			500
Shehan Run			500
Paxinos, Irish Creek			1,000
Petersburg, Garners Run			1,000
Globe Run			1,000
Irvins Run			500
Lick Run			1,000
Roaring Run			500
Philadelphia, Darbey Creek			1,000
Phillipsburg, Ardells Spring Run			500
Barker Run			500
Beaver Run			1,500
Bennens Run			1,000
Big Spring Run			500
Bilgers Run			1,000
Black Bear Run			1,500
Black Moshannon Creek			2,000
California Run			1,000
Clearwater Run			1,000
Clover Run			1,000
Cold Run			2,000
Dayton Run			1,000
Echo Glen Park Lakes			1,000
McCords Run			500
Morgan Run			1,000
Nooch Run			1,000
One Mile Run			500
Senser Run			500
Seven Springs Run			500
Shields Run			500
Six Mile Run			2,000
Smays Run			1,000
Tests Run			500
Tomtit Run			500
Upper Daugherty Run			600
Whetstone Run			500
Wolf Run			1,000
Pleasant Stream Junction, Potash Run			1,200
Pottstown, Powderdale Run			1,200
Pottsville, Big Creek			1,200
Black Creek			1,500
Breechlez Pond			600
Eichert Creek			600
Hells Creek			600
Neland's pond			600
Rattling Run			600
Seltzer Creek			600
Stony Creek			600
Strouser Creek			600
Powys, Cold Fork Run			500
Daugherty Run			600
Long Fork Run			600
Lower Daugherty Run			600
Wolf Run			600
Ralston, Rocky Run			2,000
Rattling Run, Rattling Run			500
Reading, Furnace Creek			600
Hartmens Creek			500
Hay Creek			1,000
Holdennan Creek			500
Laurel Creek			3,500
Limekiln Brook			600
Willow Creek			600
Wyomissing Creek			600

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Reedsville, Kishacoquillas Creek			2,000
Renovo, Bakers Run			2,400
Barneys Run			1,200
Benjamin Run			1,200
Boggs Run			1,200
Cranberry Run			1,200
Drurys Run			3,600
Fish Dam Run			1,400
Halls Run			1,800
Paddys Run			2,100
Shintown Run			1,400
Reynoldsville, Bear Pen Run			1,000
Black Run			1,000
Bollingers Run			1,000
Boyer Run			1,000
Britton Run			1,000
Bustop Run			1,000
Callen Run			1,000
Camp Run			1,500
Clover Run			1,000
Deans Run			1,000
Deemers Run			500
Degnan Run			1,000
Five Mile Run			1,000
Forest Run			1,000
Horn Run			1,000
Jenkins Run			1,000
Keys Run			500
Kyle Run			1,000
Laurel Run			1,000
McConnells Run			1,000
Manners Run			1,000
Mill Creek			1,000
Mitchells Run			1,000
Morrison Run			1,000
Mountain Run			1,000
Mowrey Run			1,000
O'Donnell Run			1,000
Panther Run			1,000
Pitch Pine Run			1,000
Rattlesnake Run			1,000
Schuckers Run			1,000
South Fork Creek			1,000
Stevenson Run			1,000
Toby Run			1,000
Trout Run			1,000
West Fork Creek			1,000
Whitstone Run			1,500
Windfall Run			1,000
Wolf Creek			1,000
Rising Springs, Laurel Run			2,000
Locust Run			1,000
Penns Creek			2,500
Rockport, Rapps Creek			1,000
Roulette, Bear Hollow Creek			1,000
Card Creek			500
Fishing Creek			2,000
Fish Hollow Creek			1,000
Laninger Creek			500
Reeds Run			1,500
Sartwell Creek			1,000
Trout Brook			1,000
Royer, McAllister Pond			500
Piney Creek			1,000
Sandy Run			500
Spring Run			1,000
Shade Gap, Scotts Run			500
Shenandoah, Fowler Pond			1,000
Knicker Hollow Run			1,000
Railroad Reservoir			1,000
Rattling Run			600
Shenandoah Reservoir			500
Thrashers Run			600
Trexler Run			1,000
Short Run Station, Short Run			1,000
Shrewsbury, Deer Creek			500
Smethport, Boyer Brook			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Somerfield, Youghiogheny River			400
Spruce Creek, Spruce Creek			2,000
Starrucca, Coxtown Creek			1,000
Farrell Creek			500
McKane Creek			1,000
Sampson Creek			500
Shadagee Creek			1,000
Shehawkin Creek			500
Starrucca Creek			2,000
Wild Cat Creek			500
Stewartstown, Grove Run			1,000
Stillwater, Myers Run			500
Roberts Run			500
Trout Run			500
Stroudsburg, Baker Run			500
Broadhead Creek			1,500
Brown Run			1,000
Cherry Creek			2,000
Deep Hollow Run			1,000
Kettle Run			1,000
McMichaels Creek			1,500
Mountain Creek			1,000
Pencil Creek			2,000
Pocono Creek			2,000
Sambo Creek			600
Wigwam Run			500
Tionesta, Bates Run			500
Bear Creek			500
Big Coon Creek			1,500
Chauncy Run			500
Council Run			500
Davis Run			500
Dawson Run			500
Hemlock Creek			1,500
Holeman Run			500
Indian Camp Creek			500
Jakes Run			500
Jamieson Run			500
Johns Run			500
Jug Handle Run			500
Korb Run			500
Lamentation Run			500
Little Coon Creek			1,000
Little Hickory Creek			1,000
Little Tionesta Creek			1,000
Pearson Run			500
Peters Run			500
Pigeon Run			500
Piney Run			500
Pit Hole Creek			1,500
Reck Run			500
Ross Run			1,000
Salmon Creek			1,500
Sandrock Run			500
Sibble Run			500
Stewarts Run			1,000
Sugar Run			500
Tubbs Run			1,000
Tower City, Clarks Creek			2,500
Rausch Creek			1,000
Troy, Becker Creek			600
Bullard Creek			600
Cleveland Creek			600
Covert Creek			600
Dry Run			600
Forbes Creek			600
Keith Creek			600
Kieff Creek			1,000
Kinar Creek			600
Morgan Creek			1,000
Palmer Creek			600
Rathborn Creek			1,200
Sherman Creek			600
Tamarack Creek			600
Webber Creek			500
Ulysses, Pine Creek			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.			
Waynesboro, Antietam Spring, Branch			500
Weikert, Penns Run			375
West Chester, Broad Run			500
Wheelersville, Schrader Creek			3,000
Williamsburg, Brumbaughs Run			500
Clover Creek			2,000
Marsh Run			500
Woodbine, Bells Hollow Branch			1,000
Boyds Run			1,000
Kilgore Run			500
Rocky Run			1,000
Wade Hill Branch			500
York, Green Branch			1,000
South Carolina:			
Cleveland, Fall Creek			3,200
Headforemost Creek			3,200
Reeces Gap Creek			2,400
Pickens, Big Laurel Creek			1,600
Cane Creek			2,400
Dogwood Stump Creek			3,200
Laurel Ford Creek			2,400
Laurel Fork Creek			2,400
Lynchs Mill Creek			2,400
Mathers Creek			2,400
Siele Mountain Creek			2,400
Surveyors Camp Creek			2,400
Willis Creek			2,400
South Dakota:			
Custer, Willow Creek			7,500
Deadwood, Spruce Creek			8,000
Doyle, Big Elk Creek			20,000
Dumont, Spearfish Creek, East Fork			5,000
Elmore, Ice Box Canyon Creek			10,000
Spearfish Creek			15,000
Englewood, White Wood Creek			10,000
Hanna, Little Spearfish Creek, East Fork			10,000
Hermosa, Battle Creek			12,500
Hill City, Dismal Creek			7,500
Gibson Creek			10,000
Hutton Creek, South Branch			10,000
Palmer Creek			10,000
Spring Creek			7,500
Sunday Gulch Creek			7,500
Mystic, Prairie Creek			20,000
Tittles Springs Pond			20,000
Victoria Creek			20,000
Nemo, Box Elder Creek			12,000
Jim Creek			6,000
Knowlton's pond			6,000
South Box Elder Creek			6,000
Pine Ridge Agency, Bear Creek			12,500
Pringle, Beaver Creek			8,000
Cold Brook			8,000
Rapid City, Deer Creek			20,000
Pine Forest Lake			12,500
Rapid Creek			20,000
Spring Canyon Pond			30,000
Roubaix, Carroll Creek			6,000
Halls Pond			6,000
North Elk Creek			6,000
Rochford, Little Rapid Creek, North Fork			10,000
Sisseton, Long Hollow Creek			1,000
Spearfish, Cox Lake			2,500
False Bottom Creek			2,500
Hiltons Gulch Creek			8,000
Kingsley's lake			12,000
Lindley Spring Run			14,000
McGregor Spring Branch			10,000
Miller Creek			10,000
Normal Lake			12,000
Spearfish River			75,000
Todd's pond			6,000
Spring Gulch, McDonald Pond			12,500
Sturgis, Deadmans Creek			10,000
Walker, Rock Creek Pond			12,500
Tennessee:			
Blevins, Brushy Creek			2,400

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Tennessee—Continued.			
Butter, Greggs Branch			2,400
Greenville, Camp Creek			4,000
Knoxville, Fountain City Lake			4,000
Nashville, Lipscomb's pond			800
Newport, Ground Hog Creek			2,400
Pikeville, Bradens Creek			4,000
Cooper Branch			2,400
Glade Creek			5,600
Halls Creek			3,200
Skillern Creek			4,000
Shell City, Doll Branch			1,600
Shell Creek			5,600
Slocums, Farmer Branch			1,600
Shouns, McEwen Branch			1,600
Payne creek			1,600
Utah:			
Provo, applicant	100,000		
Applicant	25,000		
Grandview Pond			1,800
Provo River		18,600	
Robins Springs Pond			1,800
Spring Creek Pond			1,800
Springdale Pond			3,600
Upper Falls Ponds			1,800
Vineyard Ponds			3,600
Salt Lake, Spring Creek			3,000
Springville, Spring Creek			2,400
Vermont:			
Averill, Forest Lake		35,000	
Little Averill Lake		55,000	
Mild Brook			1,500
Bellows Falls, Morse Brook		25,000	
Bennington, Jackson Brook		12,000	
Brattleboro, Ames Brook			1,000
Brickyard Brook			1,000
Broad Brook			1,500
Houghton Brook			1,000
Johnson Brook			1,000
Weatherhead Hollow Brook			1,000
Whetstone Brook			2,000
Wilder Brook			1,000
Castleton, Castleton River			3,500
Chester, Fullerton Brook			1,000
Williams River			3,000
Cuttingsville, Shrewsbury Pond			4,800
Fair Haven, Eureka Pond			1,000
Fowler, Fowler Brook			1,500
Greensboro, Caspian Lake			6,000
Groton, Darling Pond		125,000	7,000
Holden, Furnace Brook			10,000
Pico Pond			3,000
Hydeville Castleton River			4,000
Ferrin River		6,000	
Lyndonville, Vail's pond			850
Manchester, Batten Kill River		56,000	
Lye Brook			1,400
Mountain Brook		8,000	
Marshfield, Niggerhead Pond			3,000
Montpelier, Mallory Brook			2,500
North Bennington, Cold Springs Brook		12,000	1,250
Paran Creek		12,000	1,250
Northfield, Yatter Pond		16,000	
Pawlet, Pawlet River			5,000
Pittsford, Furnace Brook		10,000	
Sugar Hollow Brook			3,000
Plainfield, Laird's pond			4,000
Poultney, Poultney River			4,000
Pownel, Mattison Brook			2,000
Proctor, Fox Pond			4,000
Proctorsville, Williams River		20,000	
Putney, Sacketts Brook			1,500
Randolph, Ayers Brook		20,000	2,000
Bear Hill Brook		8,000	
Chandler Brook		16,000	
Clough Brook		8,000	
Eldredge Pond			500
Fisher Brook		8,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Vermont—Continued.			
Randolph, Guilds Brook		8,000	
Halfway Brook		16,000	
Howard Hill Brook		8,000	
Meadow Brook		20,000	
Mud Pond		8,000	
Roods Brook		8,000	
Roxbury Brook		12,000	
Snow Brook		8,000	
White River, Middle Branch		24,000	
Readsboro, Lamb Brook			1,500
South Branch			1,500
Rutland, Atwood Brook			1,000
Beaver Meadow Brook		8,000	
Billings Brook			1,500
Brewer Brook		12,000	
Castleton River			5,500
Chittenden Reservoir			12,000
Cold River		16,000	1,350
Cold River, North Branch		12,000	
Cold River, South Branch		32,000	
Curtis Brook		12,000	
Deermont Creek		12,000	
East Brook			1,000
Eddy Brook		8,000	
Gleason Brook		12,000	
Ira Brook		8,000	
Ottaqueechee Brook		16,000	
Ripley Brook		8,000	
Sharon, Lake Mitchell		100,000	5,425
White River		8,000	
South Royalton, Pinehurst Lake		20,000	
South Ryegate, Hatch's pond		25,000	
South Wallingford, South Wallingford Branch		16,000	
St. Johnsbury, Blodgett Brook		15,000	
Fairbanks Ponds			648
Frog Pond		10,000	500
Green Mountain Brook		20,000	
Grouselands Pond			500
Joes Brook			7,500
Lawrence Ponds			500
Meadow Brook		20,000	
Sleeper River			1,677
Spaulding Brook			1,000
Stony Brook		20,000	
Water Endrick Creek			2,000
Waterman's pond			148
Springfield, Hazen's pond			500
Stockbridge, Tweed River		8,000	2,000
Taftsville, Beaver Brook			2,000
Townshend, Shanty Lot Brook			2,000
Walden, Haynesville Brook			1,500
Lyford Pond		40,000	
Meadow Brook		20,000	
Wells, Wells Brook		16,000	
West Hartford, Dimmick's ponds			1,000
Meadow Brook		8,000	
Northcote Brook			1,000
Rockland Brook			1,000
Whipple Brook			1,000
Woodland Brook			1,000
West Paulet, Indian River		20,000	
Windsor, Mill Brook			3,000
Woodstock, Lakota Lake			4,000
Moore Pond			1,500
Smith Brook		8,000	
Wyandale Brook		8,000	
Virginia:			
Alleghany Station, Cove Creek			500
Arcadia, North Creek			400
Arrington, Mountain Spring Pond			2,400
Basic City, Baker Springs			300
Jordan Pond			1,000
Bedford, North Otter River			2,400
Big Island, Hunting Creek			4,000
Reed Creek			4,000
Covington, Cast Steel Run			600
Laurel Run			3,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Virginia—Continued.			
Covington, Roaring Run			3,000
Craigsville, Campbell Run			500
Claytons Brook			1,500
Culpeper, Hazel River			4,800
Miller Creek		18,700	
Ferrol, Trout Run			500
Glenvar, Callahan Brook			2,400
Goshen, Kelso Run			6,000
Grottoes, Big Run			300
Harrisonburg, Long Run			300
Hunters, Little Difficult Run			2,500
Jenkins Ford, Cedar Creek			600
Maurertown, Cedar Creek			6,000
Mount Vernon, Washington Spring Branch			1,000
Pearch, Horsleys Creek			2,400
Richmond, Burke's pond			600
Rockfish, Goldmine Creek			2,400
Salem, Peters Creek			6,400
Spout Spring, Steele's pond			500
Stanley, Hendersons Mill Pond			400
Tates Run, Tates Run			50
Tye River, Cox Creek			2,400
Washington:			
Addy, Stenger Creek			4,500
Bellingham, State Fish Commission	100,000		
Colville, Twin Lakes			4,500
Lake View, Clover Creek			5,000
Lamona, Crab Creek			5,500
Newport, Bead Lake			6,000
Mystic Lake			6,000
Seattle, Exposition Aquarium			18
Spangle, Spring Lake			3,000
Spokane, Newman Lake			6,000
Wenatchee, Spring Valley Pond			6,000
West Virginia:			
Berkeley, Cold Run			800
Beverly, Beaver Creek			1,000
Burner, Harper Run			1,500
Little River			2,000
Mountain Lick Run			2,000
Span Oak Run			2,000
Cairo, Lake Carrell			1,000
Capon Road, Laurel Lake			500
Capon Springs, Mutton Run			3,750
Davis, Blackwater River			2,500
Harman, Spruce Run			1,000
Harton, Candy Creek			3,000
Huttonsville, Elk River			500
Files Creek			1,500
Mill Creek			1,500
Riffles Creek			1,500
Keyser, Patterson Creek, North Fork			1,200
Marlinton, Cochrans Creek			750
Elk River, Crooked Fork			750
Indian Draft Creek			2,500
Mill Run			1,000
May, Greenbrier River			3,000
Orndorf Run			1,000
White Camp Run			1,000
Midvale, Cassity Fork Creek			3,000
Raleigh, Piney Creek			14,000
Renick, Spring Creek			500
Rippon, Bullskin Run			1,500
Seebert, Cranberry Creek			6,000
Terra Alta, Big Run			1,000
Big Wolf Creek			2,000
Buck Lick Creek			1,000
Dority Creek			2,500
Elsey Creek			2,000
Kinsinger Creek			800
Laurel Run			1,200
Little Wolf Creek			3,000
Muddy Creek			1,500
Roaring Creek			2,500
Salt Lick Creek			4,000
Snowy Creek			6,700
Spruce Run			1,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
West Virginia—Continued.			
Terra Alta, White Oak Creek			2,000
Webster Springs, Elk River, Buck Fork			600
White Sulphur Springs, Laurel Creek			1,000
Spring Branch		59,000	1,000
Turner Creek			1,000
Wildell, Elk Run			4,000
Mike Run			2,000
Snorting Lick Run			2,000
Wisconsin:			
Albertville, Little Elk Creek			3,000
Alma, Little Waumandee Creek			2,800
Alma Center, Pigeon Creek			1,200
Almena, Hay River			6,000
Arcadia, Bishop Creek			300
Eagle Valley Creek			300
French Creek			300
Gilman Creek			300
Haines Creek			300
Holcomb Coulee Creek			300
Hunters Creek			300
Kried Valley Creek			300
Lewis Valley Creek			300
Long Creek			300
Mineral Spring Brook			300
Montana Creek			300
Rocky Run Creek			300
Sandy Creek			300
Scharlow Valley Creek			300
Trout Run			300
Auburndale, Mohan Creek			4,000
Augusta, Beamans Creek			600
Bears Grass Creek			800
Beaver Creek			600
Bee Creek			300
Beef River			400
Bridge Creek			600
Browns Creek			300
Chaney Creek			300
Coon Gut Creek			300
Diamond Creek			300
Hathaway Creek			400
Hay Creek			400
Horse Creek			400
Muskrat Creek			400
Otter Creek			800
Sand Creek			300
Thompson Creek			400
Travis Creek			300
Bangor, Adams Creek			400
Big Creek			300
Burns Creek			900
Kalburan Creek			300
Sand Creek			600
Swamp Creek			300
Barneveld, Clavalin Stream			4,000
Four Mile Creek			800
Beldenville, Trimbelle Creek			900
Birchwood, Fullerton Pond			2,700
Black River Falls, Roaring Creek			6,000
Blair, Bear Creek			300
Beaver Creek			300
Lake Coulee Creek			300
Strum Creek			300
Tappan Creek			300
Tennison Creek			300
Vasse Coulee Creek			300
Welsh Coulee Creek			300
Bluff Siding, Bohlies Valley Creek			600
Bohn Valley Creek			1,000
Eagle Valley Creek			1,600
Fox Coulee Creek			1,000
French Creek			1,000
Holcomb Coulee Creek			1,400
Little Tamarack Creek			400
Norwegian Creek			400
Norway Coulee Creek			1,000

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Bluff Siding, Pine Creek			1,600
Brule, Carlson Creek			2,000
Shade Creek			4,000
Stony Brook			3,000
Cable, Big Run			4,000
Cable Lake Brook			2,000
Caps Creek			2,000
Five Mile Creek			2,000
Garrison Brook			4,000
Lynch Creek			4,000
Namekagon River			8,000
Neffs Brook			2,000
Ole Lake Brook			4,000
Spring Brook			2,000
Twin Brooks			4,000
Cadott, Big Drywood Creek			3,000
Paint Creek			4,000
Willow Creek			1,000
Camp Douglas, Little Lemonweir River			1,000
Cashton, Coon Creek			1,000
Fremstead Creek			1,000
Hanson Creek			1,000
Heiser Creek			1,000
Jersey Creek			1,000
Lyons Creek			1,000
Meissner Creek			1,000
Timber Coulee Creek			1,000
Witchman Creek			1,000
Cassville, Furnace Branch			600
Chippewa Falls, Big Beaver Creek			1,000
Clear Creek			1,000
Drywood Creek			1,000
Duncan Creek			1,000
Eighteen Mile Creek			1,000
Elk Creek			1,000
Hay Creek			1,000
Jims Falls Creek			1,000
Little Beaver Creek			1,000
Little Drywood Creek			1,000
Little Hay Creek			1,000
McCann Creek			1,000
Murphy Creek			1,000
Nicoli Creek			1,000
Paint Creek			1,000
Seth Creek			1,000
Tenmile Creek			1,000
Trout Creek			1,000
Cochrane, Breams Valley Brook			300
Bulls Valley Brook			300
Dannser Valley Brook			300
Esbach Brook			300
Florin Valley Brook			300
Irish Valley Brook			300
Johns Valley Creek			600
Mill Creek			300
Montane Brook			300
Oak Valley Brook			300
Rebhahu Valley Brook			300
Rose Valley Brook			300
Rutschou Brook			300
Schaub Brook			300
Schoepps Valley Brook			300
Schultz Brook			300
Weisenberger Brook			300
Wolf Valley Brook			300
Yaeger Brook			300
Crandon, Andrews Pond			1,000
Drake Creek			1,000
Mud Lake			4,000
Rice Creek			3,000
Swamp Creek			2,000
Wolf River			1,000
Cumberland, Miller Creek			4,500
Dodgeville, Bremker Creek			500
Edmunds Branch			3,000
Hoskins Branch			3,000
Middleberry Creek			800

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Dodgeville, Smith Creek			3,000
Williams Stream			1,500
Drummond, Jaders Creek			4,500
Johnson Creek			1,500
Long Lake Branch			4,500
Durand, Averill Creek			300
Bear Creek			1,200
Big Arkansas Creek			2,000
Big Coulee Creek			1,000
Drier Creek			1,000
Fall Creek			1,200
Fox Creek			300
Gray Creek			300
Heron Creek			1,000
Little Arkansas Creek			2,000
Porcupine Creek			2,000
Spring Creek			600
Eau Claire, Beaver Creek			1,600
Clear Creek			1,600
Coon Creek			1,500
Craft Creek			1,000
Cranberry Creek			800
Deer Creek			500
Eight Mile Creek			1,000
Eighteen Mile Creek			1,000
Elk Creek			2,600
Five Mile Creek			1,500
Grace Creek			400
Hansen Creek			2,000
Little Niagara Creek			300
Little Rock Creek			500
Lowes Creek			1,800
Nine Mile Creek			1,800
North Creek			300
Otter Creek			1,000
Pine Creek			500
Rock Creek			1,600
Sandy Creek			500
Seven Mile Creek			1,500
Sherman Creek			1,600
Spring Creek			1,300
Trout Creek			1,800
Twelve Mile Creek			1,000
West Creek			1,000
Wrights Creek			800
Edgewater, Arfin Creek			1,000
Beaver Creek			1,000
Billikin Springs Creek			2,000
Casey Creek			1,000
Derosier Creek			1,000
Hay Creek			2,000
Laughing Water Creek			1,000
Mallard Creek			1,000
Moose Creek			2,000
Nelson Creek			1,000
Pigeon Creek			2,000
Plum Creek			1,000
Sissebagama Creek			1,000
Trout Creek			2,000
Yarnell Creek			2,000
Elcho, Hunting River			9,000
Eleva, Big Creek			1,000
Trout Creek			1,000
Ellsworth, Brush Creek			3,000
Cave Creek			3,000
Isabelle Creek			3,000
Lost Creek			3,000
Elmwood, Big Mosourie River			4,000
Cady Creek			3,000
Cave Creek			3,000
Eau Galle River			4,000
Plum Creek			4,000
Fairchild, Black Creek			300
Boatman Creek			300
Coon Fork Creek			600
Coon Gut Creek			300
Flick Creek			600

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Fairchild, Johnson Creek			400
McLaren Creek			300
Marrin Creek			300
Pitts Creek			300
Toals Creek			300
Travis Creek			300
Fennimore, Legged Creek			4,500
Fond du Lac, Parson Brook			500
Foxboro, Big Balsam Creek			6,000
Empire Creek			4,000
Little Balsam Creek			4,000
State Line Creek			6,300
Galesville, Beaver Creek			300
Beaver Creek, North Branch			300
Beaver Creek, South Branch			900
Bean Creek			300
Corrigan Creek			300
Coulee Creek			300
Crystal Valley Creek			300
Dutch Creek			300
French Creek			300
Grant Creek			300
Hardy Creek			600
Silver Creek			300
Tamarack Creek			300
Gleason, Eight Mile Creek			2,000
Hay Meadow Creek			2,000
North Branch River			2,000
Pine River			2,000
Silver Creek			2,000
Glenwood, Balons Creek			400
Behrens Creek			400
Beleans Creek			300
Blakely Creek			300
Bolan Creek			400
Browns Creek			300
Camp Nine Creek			300
Conners Creek			300
DeSmith Creek			600
Eldridge Creek			300
Jacobson Creek			300
Johns Creek			300
Little Beaver Creek			400
Morgan Creek			300
Sachse Creek			300
Sand Creek			700
Sullivan Creek			300
Torgeson Creek			300
Vance Creek			400
Grand Rapids, Five Mile Creek			1,000
Green Bay, De Greef's pond			500
Greenwood, Alder Creek			300
Black Creek			2,400
Cawley Creek			500
Colby Creek			2,000
Dickerson Creek			400
Giler Creek			300
Hay Creek			300
Kawley Creek			2,000
Nichol Creek			300
Norwegian Creek			2,400
Rock Creek			500
Rocky Run			2,400
Wedges Creek			500
Hackley, Hackley Creek			3,000
Harshaw, Bearskin Creek			5,000
Little Bear Creek			1,000
Rice Creek			3,000
Heineman, Prairie River			900
Hixton, Amo Creek			1,000
Curran Creek			1,000
Gaulster Creek			1,000
Holmes Creek			1,000
Judkins Creek			1,000
Larson Creek			1,000
Lowe Creek			1,000
Mortiboy Creek			1,000

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Hixton, Nettleton Creek			1,000
North Brauch			1,000
Pine Creek			2,000
Schmerhorn Creek			1,000
Simpson Creek			1,000
Tank Creek			1,000
Timber Creek			1,000
Hudson, Willow River			3,000
Independence, Bennett Valley Creek			300
Borst Valley Creek			1,300
Bruce Valley Creek			1,300
Burt Valley Creek			1,000
Chimney Rock Creek			1,300
Cookes Creek			1,000
Dubil Valley Creek			1,000
Elk Creek			1,300
Elk Creek Pond			300
Engum Creek			1,000
Finright Creek			1,000
Gunderson Creek			1,000
Hawkinson Creek			1,000
Husselgard Creek			1,300
Ignatz Lyga Creek			1,000
Kilniss Creek			1,000
Kurth Valley Creek			1,000
Lyga Creek			1,000
Maloney Creek			1,000
Nelson Valley Creek			1,000
North Branch Creek			1,300
Olson Creek			1,000
Plumb Creek			1,300
Poppies Creek			1,000
Roskos Creek			1,000
Russell Valley Creek			1,000
Rusts Creek			1,000
Schaffners Creek			1,000
Simonson Valley Creek			1,000
Skogstad Creek			1,300
Slanton Creek			1,000
Solfest Creek			1,300
Traverse Valley Creek			1,300
Uetz Creek			1,000
Ulbug Valley Creek			1,000
Vennis Creek			1,000
Zimmer Creek			1,300
Iron River, Iron River			4,000
Muskeg Creek			8,000
Pine Lake			4,000
Kendall, Brainard Creek			300
Davis Creek			300
Oborn Creek			300
Smiths Creek			300
La Crosse, Fays Creek			400
Sand Creek			300
La Farge, Dalton Spring Branch			300
Indian Creek			2,000
North Bar Creek			4,000
Spring Creek			4,000
Lancaster, Austin Branch			3,000
Beatham Branch			3,000
Borah Branch			3,000
Club Branch			3,000
Day Branch			1,500
McKenzie Branch			1,500
McPherson Branch			1,500
Millner Branch			3,000
Pollock Branch			1,500
Raines Branch			3,000
Trollope Branch			3,000
Walker Branch			3,000
Williams Branch			3,000
Lavalle, McGloy Creek			300
Long Lake, Coldwater Creek			4,000
Manitowoc, Francis Creek			3,000
Hermans Creek			3,000
Mellen, Bad River			10,000
Tyler Forks River			1,000

Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Menomonie, Anderson Creek			800
Annis Creek			800
Asylum Springs Creek			800
Balsbaugh Creek			800
Beaver Creek			800
Big Elk Creek			800
Big Hay Creek			800
Big Meadow Creek			800
Bishop Creek			800
Biss Creek			800
Blairs Creek			800
Boland Creek			1,600
Browns Creek			800
Clarks Creek			800
Coon Creek			800
Cowan Creek			800
Cranberry Creek			800
Dashone Creek			800
Denning Creek			800
Drowleys Spring Creek			800
Eau Galle River			800
Eddy Creek			800
Eighteen Mile Creek			800
Fall Creek			800
Foss Creek			800
Galloway Creek			800
Gilbert Creek			800
Hay River			1,600
Home Farm Creek			800
Iron Creek			800
Irvin Creek			800
John Creek			800
Kings Creek			800
Knights Creek			800
Kripple Creek			800
La Forge Creek			800
Lambs Creek			1,600
Little Beaver Creek			800
Little Elk Creek			800
Little Hay Creek			800
Little Missoni River			800
Little Otter Creek			800
Little Sand Creek			800
Losby Run			800
Louis Creek			800
Lower Pine Creek			800
Lynch Creek			800
McCarthy Creek			800
Missoni River			800
Mud Creek			800
Otter Creek			800
Palmers Run			800
Paradise Creek			800
Parker Springs Creek			800
Popple Creek			800
Roach Creek			800
Rock Creek			800
Rush Creek			800
Sand Creek			800
Shofer Creek			800
Simonson Creek			800
Sinking Creek			800
Sly Creek			800
Smith Creek			800
Spring Creek			800
Stoner Creek			800
Thum Creek			800
Tiffany Creek			800
Torgerson Creek			800
Trout Creek			800
Upper Pine Creek			800
Varney Creek			800
Weber Creek			800
White Creek			800
Wilcox Creek			800
Wilson Creek			1,600
Wolf Run			800

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Merrillan, Arnold Creek			2,000
Cesna Creek			2,700
Clark Creek			300
Farka Creek			1,300
Flood Creek			400
Gearing Creek			1,300
Hall Creek			2,000
Hayden Creek			500
Houghton Creek			300
Hunters Creek			300
Jones Creek			300
Pine River			1,200
Prairie Creek			2,000
Stocknell Creek			600
Van Hersey Creek			1,000
Visneau Creek			1,500
Millston, Alvord Creek			1,000
Clear Creek			1,000
Dunham Creek			1,000
Gebhardt Creek			1,000
Glen Creek			1,000
Hauser Creek			2,000
Indian Creek			1,000
Ketchum Creek			1,000
King Creek			1,000
Lamb Creek			1,000
Lambert Creek			1,000
Merritt Creek			1,000
Mill Creek			1,000
Patterson Creek			1,000
Pigeon Creek			1,000
Pongartz Creek			1,000
Pulling Creek			1,000
Pump Creek			1,000
Robinson Creek			1,000
Rudd Creek			2,000
South Wyman Creek			1,000
Spring Creek			1,000
Stanton Creek			2,000
Wyman Creek			1,000
Mondovi, Adams Creek			300
Bennett Valley Creek			400
Big Creek			300
Brown Creek			300
Carroll Creek			500
Cranberry Creek			500
Dutch Creek			300
Elk Creek			300
Fifteen Creek			300
Ford Creek			600
Gilman Valley Creek			300
Hoovey Creek			500
Merritt Creek			300
Neal Creek			300
Rock Creek			500
Rosman Creek			500
Silver Creek			300
Whelan Creek			300
Muscoda, Booth Hollow Creek			300
Byrds Creek			300
Indian Creek			600
Ludvick Branch			300
Sixmile Branch			300
Wall Branch			300
Nashville, Clear Lake			6,000
Spring Creek			3,000
New Auburn, Duncan Creek			1,000
Sand Creek			600
New Lisbon, White Creek			900
Oregon, Bodfish Creek			4,500
Pepin, Big Plum Creek			600
Bogus Creek			300
Elk Creek			300
Little Plum Creek			300
Lost Creek			300
Porcupine Creek			300
Roaring River			600

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Phipps, McDermott Brook			1,500
Nemokagon River			6,000
Rogers Creek			4,500
Plymouth, Mullet Creek			10,000
Union River			3,000
Rice Lake, Angler Creek			300
Barker Creek			300
Big Bear Creek			1,000
Big Kettle Creek			1,000
Browns Creek			1,000
Cannon Creek			1,000
Cobb Creek			1,000
Cranberry Creek			300
Desair Creek			300
German Creek			1,000
Hay River			1,000
Heger Creek			300
Hemlock Creek			300
Kegamo Creek			1,000
Little Bear Creek			300
Little Spring Creek			300
Long Lake Stream			1,000
Meadow Creek			1,000
Miller Creek			300
Moosier Creek			1,000
Mud Creek			1,000
Olson Creek			1,000
Overby Creek			1,300
Pekegamo Creek			300
Prairie Creek			300
Renville Creek			1,000
Rice Creek			1,000
Savage Creek			1,000
Silver Creek			300
South Creek			300
Spoon Creek			1,000
Spring Creek			300
Spur Nine Brook			300
Sucker Creek			1,000
Weiss Creek			1,000
West Branch			300
Yellow River			300
Richland Center, Ash Creek			600
Fancy Creek			600
Little Willow Creek			600
Melancthon Creek			600
Pine River			200
Ridgeway, Mill Creek			1,000
River Falls, Kinnickinnic Creek			900
Nye Creek			600
South Fork River			900
Rosendale, Silver Creek			600
Solon Springs, Ox Creek			1,500
Sparta, Beaver Creek			300
Big Creek			1,100
La Crosse River			400
Little La Crosse River			400
Sargent Creek			300
Silver Creek			300
Soper Creek			300
Sparta Creek			300
Squaw Creek			300
Tarr Creek			300
Tuttles Creek			300
Walworth Creek			300
Spring Valley, Bahrs Creek			300
Burghardt Creek			300
Cady Creek			300
Cave Creek			600
Eagle Springs			300
French Creek			300
Gilbert Creek			1,200
Jacobson Creek			300
Johnson Creek			300
Lohns Creek			300
Lousy Creek			600
Mines Creek			300

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Spring Valley, Rush River			1,200
Stanley, Hay Creek			4,000
Swim Creek			3,000
Stitzer, Bald Branch			4,500
Leggett Branch			4,500
Superior, Wisconsin Creek			6,000
Thorp, Bolin Creek			2,000
Lost Creek			2,000
Sterling Creek			3,000
Tomah, Brandy Creek			2,000
Council Creek			2,000
Deer Creek			1,000
Dodgeville Creek			2,000
Jennings Creek			2,000
Mill Creek			2,000
Mud Creek			1,000
Sand Creek			2,000
Silver Creek			1,000
Sparta Creek			2,000
Spring Bank Pond			1,000
Viola, Church Creek			3,000
Viroqua, Bishop Branch			4,000
Cotter Creek			2,000
Duck Eggs Branch			1,000
Pine Hollow Creek			1,000
See Branch			1,000
Warrens, Bettz Creek			300
Brandy Creek			300
Castle Rock Creek			300
Dampka Creek			300
Fish Creek			300
Harp Creek			300
Lowrie Creek			300
Matchett Creek			300
Sand Creek			300
Second Creek			300
Wausau, Jim More Creek			4,000
Wautoma, Beebe Creek			3,800
Birch Creek			600
Bird Creek			2,000
Chafee Creek			3,000
Lunch Creek			3,000
Pine Creek			2,000
Wedde Creek			2,000
White River			3,000
Westby, Bad Axe River			1,200
Clear Branch			300
Clockmakers Creek			2,300
Coon Creek			2,300
Crumo Spring Creek			2,000
Dauve Spring			300
Jown Vele Creek			1,000
Kickapoo Creek			1,200
Knapp Creek			1,300
North Bad Axe River			900
Paulsrud Creek			300
Paulson Creek			600
Sanding Creek			1,300
Seas Branch			2,000
Sherve Creek			1,000
Spring Coulee Creek			2,000
Spring Valley Creek			300
Sveen Creek			2,000
Timber Coulee Creek			2,000
Timber Valley Creek			300
Van Ruden Creek			2,300
West Salem, Adams Valley Creek			400
Bostwicks Valley Creek			400
Burns Creek			400
Cliff McClentock Creek			300
Gilles Coulee Creek			300
Green Creek			300
Holberg Creek			300
Johnson Creek			300
Jones Creek			600
Kincade Creek			300
Larson Creek			300

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
West Salem, Louis Valley Creek			400
Luce Creek			300
McEldowney Creek			600
Martin Creek			300
Memkings Creek			300
Rackley Creek			300
Raum Creek			300
Ruland Creek			300
Thronson Creek			400
Tousche Creek			300
Young Creek			300
Wheeler, Big Beaver Creek			1,000
Big Otter Creek			1,000
Blank Creek			1,000
Carey Creek			1,000
Hay River			1,000
La Forge Creek			1,000
Lambs Creek			1,000
Little Beaver Creek			1,000
Little Otter Creek			1,000
Page Creek			1,000
Whitehall, Barlow Valley Creek			300
Beaver Creek			300
Bruce Valley Creek			300
Elk Creek			600
Fly Creek			300
Hay Creek			300
Irvine Creek			300
North Valley Creek			300
Pigeon Creek			300
Wild Rose, Willow Creek			800
Willard, Cameron Creek			600
Tinning Horn Creek			500
Wilton, Adrian Creek			300
Beacher Creek			1,500
Hibbard Creek			300
Kinney Creek			300
Sinks Creek			3,300
Slaten Creek			300
Waege Creek			1,500
Winneboujou, Big Lake			2,000
Black Hoof Creek			4,000
Brule River			23,000
Cutler Creek			2,000
Govan Springs Pond			2,000
Lake Florence			4,000
Little Brule River			2,000
Lucius Lake			2,000
Miles Creek			2,000
Rock Creek			2,000
Sandy Run			2,000
Stones Creek			2,000
Wheatons Creek			2,000
Wyoming:			
Clark, Clarks Fork River			2,000
Green River, Green River			6,000
Kemmerer, Rock Creek			3,000
Lander, Cabin Lake			2,500
Hobbs's lake			2,500
Popo Agie River			2,500
Upper Lake			2,500
Laramie, Laramie River			5,500
Willow Creek			10,000
Manhattan, Spotted Tail Creek			12,500
Yellowstone National Park, Glen Creek			5,000
Indian Creek			15,000
Willow Creek			20,000
Japan:			
Tokyo, Japanese Government	5,000		
Total [a]	516,000	7,365,945	4,085,174

[a] Lost in transit, 23,600 fry and 158,687 fingerlings.

Details of Distribution of Fish and Fish Eggs—Continued.

SUNAPEE TROUT.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
New Hampshire:			
Lake Sunapee, Lake Sunapee		115,029	
Newbury, Lake Sunapee		56,000	
Total		171,029	

GRAYLING.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Montana:			
Lakeview, Elk Creek		16,000	
Elk Lake		65,000	
Washington:			
Seattle, Exposition Aquarium			18
Wyoming:			
Sheridan, Bear Creek	25,000		
Total	25,000	81,000	18

SMELT.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maryland:			
Mountain Lock, Potomac River			9,000
New York:			
Raquette Lake, Lake Kora	4,500,000		
Total	4,500,000		9,000

PIKE.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Iowa:			
Lime Springs, Upper Iowa River			700
North McGregor, Mississippi River			1,900
Minnesota:			
Brownsville, Mississippi River			18,650
Wisconsin:			
Genoa, Mississippi River			500
La Crosse, Mississippi River			19,650
Prairie du Chien, Mississippi River			1,900
Total			43,300

PICKEREL.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin:			
Genoa, Mississippi River			166
La Crosse, Mississippi River			168
Victory, Mississippi River			166
Total			500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CRAPPIE AND STRAWBERRY BASS.

Disposition.	Fingerlings, yearlings, and adults.
Arkansas:	
Harrell, Spring Dale Pond	70
Helena, Blue Hole	7,000
Long Lake	22,200
Mississippi River	145,610
Junction, Spring Lake	70
Nashville, Mine Creek	250
Patmos, Mental Pond	100
Stamps, Mucille Lake	60
Price Pond	185
Washington, Allen's pond	100
Connecticut:	
Danbury, Kellogg's pond	250
Wolf Pond	250
New Haven, Granniss Lake	200
Illinois:	
Avena, Willow Lake	200
Belleville, Club Pond	150
Heinemann's lake	400
Carbondale, Club Lake	200
Simons Lake	200
Carterville, Peyton's pond	250
Donnellson, Clover Leaf Lake	150
East Hannibal, Sni E'Carte River	750
Herrin, Manning Pond	500
Mine Pond	500
Hillsboro, Seymour Club Lakes	300
Lake Forest, Whitehall Pond	320
Indiana:	
Haubstadt, Oak Summit Pond	100
Lebanon, Bramble Gravel Pit	100
Paoli, Willow Lake	100
Richmond, Crystal Lake	200
Shell Brook Pond	200
Iowa:	
Algona, Upper Des Moines River, East Branch	400
Fort Madison, Green Bay	125
Independence, Wapsipinicon River	400
North McGregor, Mississippi River	46,000
Stockport, Silver's pond	100
Kansas:	
Caldwell, Bluff Creek	1,000
Farlington, Mitchell's pond	25
Kentucky:	
Bradford, Locust Brook Pond	100
Meadow Brook Pond	100
Campbellsburg, Sanford Pond	100
Cropper, Willow Pond	100
Emmons, Breezy Heights Pond	100
Lebanon, Graham's pond	150
Rogers's pond	150
Louisville, Cemetery Lake	100
Lake Lansdowne	300
St. Mary, Forester Lake	200
Louisiana:	
Athens, Gandy's pond	100
Marsalis Pond	100
Bernice, Chalybeate Spring Pond	70
Heard's pond	70
Keatchie, China Grove Lake	100
Mansfield, Bickerstaff Lake	150
Brick Company's pond	100
Many, Hoagland's pond	130
Quitman, Harvey's pond	70
Spring Lake	70
Ruston, Hancock's pond	100
Maryland:	
Mountain Lock, Potomac River	247
Prince George County, Goodloe's pond	100
Minnesota:	
Brownsville, Mississippi River	43,250
Rochester, Zumbro Mill Pond	20
Wheaton, Lake Traverse	200
Mississippi:	
Booneville, Beach Bluff Lake	100
Hollaway Lake	100
Red Elm Lake	200
Columbus, Mullins Lake	100
Corinth, Lake Billsville	250
Macon, Poplar Lake	100
Willow Glen Pond	100
Noxapater, Estes's pond	100
Philadelphia, Spring Pond	100
Tupelo, Sterns's pond	100
West Point, Fortson Lake	100
Missouri:	
Aurora, Crane Creek	300
Butler, Lake Katherine	100
Higginsville, Railroad Pond	275
Mount Vernon, Honey Creek	300
Hoshaw Lake	200
Jaggerman Lake	200
Johnson's lake	200
Spring River	400
Nevada, Katy Allen Lake	100
Springfield, Walnut Spring Lake	200
Warrensburg, Meily's lake	100
West Plains, Carter's pond	100
Willow Springs, Maple Pond	100
New York:	
Albany, Stevens's pond	100
Newark, Asylum Reservoir	100
North Carolina:	
Hendersonville, Jane Mill Pond	200
Lake Osceola	300
Rainbow Lake	150
North Dakota:	
Berlin, Rush Pond	55
Fullerton, Appelquist Pond	100
Glen Ullin, Sprecher's pond	100
Hankinson, Lake Elsie	200
Lisbon, Prairie Farm Lake	100
Ohio:	
Bradford, Greenville Creek	350
Covington, Stillwater River	250
Gettysburg, Greenville Creek	250
Winton Place, Hollywood Lake	200
Oklahoma:	
Alva, Harbaugh Lake	175
Apache, Morgan's ponds	100
Spring Pond	50
Sturman's pond	50
Wogan's pond	50
Ardmore, Camp Brown Creek	400
Edward's pond	300
Hickory Creek	200
Love's lake	300
Silver Lake	400
Barron Fork, Yonah Poud	100
Bliss, Arkansas River	200
Canute, Turkey Poud	150
Chouteau, Bledsoe Pool	100
Cleveland, Silver Lake	100
Cushing, Willow Pond	100
Elgin, South Side Farm Pond	50
El Reno, Nettie Ruth Lake	300
Fletcher, Cox Reservoir	150
Gracemont, Walnut Grove Pond	100
Marietta, Black Lake	50
McKinney's pond	65
Smith's pond	50
Washington Lake	50
Noble, Appleby's pond	50
Oklahoma City, Deepwater Lake	150
Fields's pond	175
Gaylord's pond	200

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CRAPPIE AND STRAWBERRY BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Oklahoma—Continued.	
Oklahoma City, Gum's lake	200
Turner's lake	100
Oologah, Sunday's pond	100
Pawhuska, Clear Creek	100
Snyder, Deep Pond	150
Terral, Ewing's lake	100
Yukon, Kralick Run	100
Pennsylvania:	
Falls Station, Lake Winola	200
York, Codorus Creek, South Branch	150
South Carolina:	
Aiken, Black Poplar Pond	100
Belton, Belton Mills Pond	100
Bishopville, Kelley's lake	125
Central, Arnold's pond	100
Chappells, Mills Pond	100
Scurry Pond	100
Webb's pond	100
Clover, Campbell's pond	75
Darlington, Creek Pond	150
Fair Forest, Fair Forest Creek	100
Fountain Inn, Durbin Creek Pond	100
Greenville, Saluda Silver Lake	200
Rembert, Evans's pond	125
Wateree, Griffin Creek Pond	100
Yorkville, Turkey Creek Pond	100
Tennessee:	
Somerville, Allbright's lake	200
Texas:	
Albany, Kellum's pond	30
Broyle's pond	30
Waterworks Pond	100
Annona, Capital Lake	40
Arlington, Jones's pond	30
Artesia, McWhorter's reservoir	20
Athens, Gauntt's lake	15
Koon Kreek Klub Lake	100
Prater's lake	20
Atlanta, Warren's lake	40
Austin, Austin Lake	50
Slaughter Lake	100
Windy Crest Lake	30
Bay City, Austin's pond	20
Water Works Pond	20
Beckville, Parker's lake	100
Big Sandy, Big Sandy Lake	50
Lake Everman	100
Robinson's lake	50
Blossom, Patton's pond	26
Brazoria, State Farm Lake	50
Canyon City, Paloduro Creek	100
Spring Creek Lake	100
Carmona, Carmona Pond	40
Carthage, Davis's lake	50
Prior's pond	100
Center Point, Guadalupe River	100
Verde Creek	100
Childers, Lake Scott	200
Clarksville, Clear Lake	50
Grassy Lake	100
Round Lake	100
Coleman, Coleman Lake	100
Lost Creek	100
Santa Anna Branch	100
Sunnyside Lake	75
Coolidge, Karner Lake	30
Copperas Cove, Dewald's pond	20
Corsicana, Corsicana Fish Association Pond	50
Water Works Lake	40
Cotulla, Cartwright's reservoir	40
Counter Switch, Country Club Lake	175
Crockett, Daniel's lake	30
Dallas, Munger's pond	20
Texas—Continued.	
De Kalb, Crump's pond	30
Detroit, Oil Mill Pond	30
Elgin, Elgin Lake	20
Elkhart, Elkhart Lake	100
Farwell, Hamlin Pond	31
Fort Worth, Lake Homewood	140
Garrison, Cedar Lake	50
Giddings, Fisher's pond	65
Jaehne's pond	30
Raube's lake	30
Sumff's pond	25
Symm's pond	30
Thonig Pond	30
Toepper's pond	25
Volkers's pond	30
Graham, Norris's lake	106
Oak Grove Pond	50
Worthington Knox Lake	50
Grand Saline, Malone Pond	20
Grapeland, Tyers Lake	50
Willow Lake	30
Groveton, Friday's pond	30
Nelms's lakes	80
Hamlin, Red Lake	20
Haysland, Lake Shelby	75
Honey Grove, Fin and Feather Club Lake	100
Jacksboro, Cooper Lake	50
Mays Lake	20
Jacksonville, Hillside Lake	75
Jordan Lake	75
Park Lake	75
Sampson Lake	100
Shearn Lake	75
Jonesville, Lake Sand Hill	100
Kaufman, Bond's pond	10
Gilmore Lake	100
Hatch Pond	20
Hindman's pond	20
Sand Lake	20
Taylor's pond	50
Warrenskjold Lave Lake	20
Kemp, Long Lake	100
Kent, Tatum's pond	25
Kerrville, Turtle Creek Pond	30
Lampasas, Collins's pond	20
Lillian, Reese Branch Pond	40
Llano, Llano Lake	315
Longview, Beale Lake	75
Fisher Lake	75
Lake Lomond	100
Lovelady, Duck Lake	100
Kelley Pond	20
McDade, Milton's pond	20
Manchaca, Bear Creek	50
Marshall, Bentley Lake	30
Bonita Lake	100
Lake Ferns	100
Thelma Lake	60
Mart, Club Lake	150
Midlothian, Cooper's lake	40
Mineola, Goldsmith's pond	30
Mineral Wells, Kearby Tank	25
Mount Calm, Nelson Pond	10
Stovall Pond	40
Mount Selman, Brock's lake	30
Mayfield's pond	20
Naples, Naples Club Lake	15
Walker's pond	30
Nash, Earnest's lake	100
Normanna, Blackburn's pond	28
Paige, Gropp Pond	30
Horn's pond	20
Palestine, Bear Lake	200

Details of Distribution of Fish and Fish Eggs—Continued.

CRAPPIE AND STRAWBERRY BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Texas—Continued.	
Palestine, Cartmell's lake	20
East Side Park Pond	30
Wallace Lakes	40
Paris, Stannard's pond	20
Willow Lake	30
Petty, Fielding Lake	100
Queen City, Prator's pond	20
Rockdale, Clear Lake	50
Rotan, Willingham Pond	100
Royston, Brooks's pond	30
California Creek Lake	50
Henry's tank	50
Stephens's tank	100
Saginaw, Kane's pond	35
San Angelo, Concho River, Middle and South Forks	133
Dove Creek	60
Kickapoo Creek	133
Water Valley Country Club Lakes	74
San Antonio, Lamm's tank	30
Mitchell Lake	100
San Marcos, Blue Hole Pond	25
Saron, William Lake	30
Sulphur Springs, Elberta Lake	100
Picnic Lake	50
Thomas Lake	50
Taylor, Roberts's lake	20
Temple, Lake Polk	75
Terrell, Bass Lake	20
County Club Lake	75
Elm Pond	50
Green Lake	20
Grinnan Pond	20
High Point Creek	75
Martin Pond	30
Muckleroy Pond	40
Sargent Pond	20
Timpson, Bussey's pond	20
McWilliams's pond	20
Tye, Crawford Lakes	25
Tyler, Clear Spring Lake	50
DeLay's lake	100
Lake Park Lake	100
Lakewood Country Club Lake	100
Murphy's pond	30
Texas—Continued.	
Tyler, Pine Hill Lake	30
Tyler Fin Club Lake	100
Waco, Katy Club Lake	100
Wills Point, Imperial Lake	100
Virginia:	
Culpeper, Englands Mill Pond	200
Dillwyn, Fitzgerald Pond	125
Fredericksburg, Boscobel Pond	500
Leesburg, Goose Creek	300
Lynchburg, Murrell Pond	100
Midlothian, Midlothian Pond	100
Natural Bridge, Cedar Creek	400
Petersburg, Belschers Pond	150
Hauslik Pond	325
Spicer Pond	200
Richmond, Crittenden Pond	200
Darbytown Pond	200
Fulton Fishing Club Pond	200
Selden's pond	200
Rockfish, Rockfish Lake	200
Scottsville, Chester Pond	100
Soudan, Grass Creek	200
Suffolk, Lake Savage	200
Sweet Briar, Sweet Briar Lake	200
Winterpock, Indian Spring Pond	150
Zuni, Joyner's pond	200
Richardson's pond	200
West Virginia:	
Blueton, Holley's pond	150
Philippi, Middle Fork River	400
Salisbury, Salisbury's pond	200
Wisconsin:	
Genoa, Mississippi River	5,832
Independence, New City Pond	250
Kewaskum, Beachwood Lake	200
La Crosse, Mississippi River	49,086
Millston, Polley Creek	200
Mosinee, Half Moon Lake	350
Prairie du Chien, Mississippi River	46,000
State Line, Pickerel Lake	200
Victory, Mississippi River	3,332
Wausau, Lake Wausau	400
O'Day Lake	250
Silver Creek Bay	400
Total [a]	410,428

ROCK BASS.

Disposition.	Fingerlings, yearlings, and adults.
Alabama:	
Fivepoints, Poplar Springs	100
Arizona:	
Wilcox, McComb Ranch Pond	100
Arkansas:	
DeQueen, Gantlon's pond	500
Gravette, Dow's pond	250
Harrison, Estes's pond	400
Helena, Mississippi River	9,915
Mena, Irons Fork River	500
Mountain Fork River	500
Ouachita River	500
Prairie Creek	500
Rock Creek	500
Twomile Creek	500
Pine Bluff, Trigg's pond	200
Connecticut:	
New Haven, Hubinger's lake	500
Georgia:	
Etowah, Hill's pond	100
Ringgold, Tiger Creek	300
Illinois:	
Belleville, Club Pond	100
Carbondale, Thompson's lake	300
Donnellson, Cherry Grove Pond	100
Wilson's pond	200
DuQuoin, Egyptian Pond	100
McLeansboro, Goehring's pond	100
Indiana:	
Bloomfield, Richland Creek	550
Boonville, Hemenway's pond	500
Carlisle, Wellington Pond	150
Cory, Prairie Lake	200
Woodland Lake	200
Danville, Soper's pond	200
Evansville, Clear Pond	150
Stringtown Springs Pond	150
Fairmont, Brookshire's pond	100
Fort Branch, Symond's pond	100
Greencastle, Lake Woodland	200
Greentown, Ayres's pond	100
Macy, Baker's pond	100

[a] Lost in transit, 9,049 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

ROCK BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Indiana—Continued.	
Plainfield, Spright's pond	500
Seymour, Bars Pond	200
Kasting's pond	200
Summitville, McLain's pond	100
Wawaka, Fountain View Pond	100
Winchester, Gravel Pit Pond	100
Iowa:	
Manchester, Maquoketa River	325
Kansas:	
Chanute, Durey Pond	100
Cherokee, Allen Pond	150
Farlington, Mitchell's pond	150
Leavenworth, Park Lake	200
Marion, Bruno Creek	50
East Creek	50
French Creek	50
Lyons Creek	50
Medicine Lodge, Houchin's pond	100
Kauffman's pond	100
Peabody, Calbeck's pond	50
Kentucky:	
Beaver Creek, Hindman Pond	125
May's pond	125
Buechel, Blankenbeker's pond	200
Campbellsville, Creel's pond	175
Cropper, Turnpike Pond	100
Dover, Jennings Pond	150
Lebanon, McElroy's pond	175
Lexington, Lake Callahan	400
Louisville, Parkview Club Lake	200
Schroerluecke's pond	200
Paris, Brannon's pond	100
Clarke's pond	100
Clay Pond	100
Edwards Pond	100
Frazier Pond	100
Grayson Pond	100
Hedge Pond	100
Jackson's pond	100
Maher's pond	100
Paynes Pond	100
Purnell's pond	100
Vimont's pond	100
Watson Pond	100
Wiggins Pond	100
Shawhan, Estes's pond	100
Ewalt's pond	100
Winchester, Twomile Creek	200
Louisiana:	
Arcadia, Boone's springs	100
Grand Cane, Grand Cane Creek Pond	100
Homer, Gandy's pond	100
Maryland:	
Ijamsville, Quynn's pond	200
Monrovia, Cashour's pond	200
Mountain Lock, Potomac River	2,010
Thurmont, Hemler's pond	230
Michigan:	
Bath, Park Lake	200
Minnesota:	
Rochester, Zumbro River, South Branch	200
Mississippi:	
Guntown, Cochran's pond	100
Pontotoc, Gardner's pond	125
Highland Fish Co. Lake	100
Patterson's pond	125
Ripley, Keenin's pond	100
Missouri:	
Butler, Lake Catherine	5,000
Glasgow, Steinmetz Pond	100
Holmes, Dunlap's lake	100
Joplin, Wild Cat Spring	200
Marshall, Stedem Pond	100
Missouri—Continued.	
Merwin, Corbin's ponds	3,000
Mount Vernon, Gillingham's pond	250
Skinner's pond	250
Tillotson's spring	200
Truitts Creek	750
Williams Creek	500
Neosho, Twin Springs	500
New Mexico:	
Ancho, Cooper's lake	200
Carlsbad, Dark Canon Creek	225
Deming, Knowles's pond	100
Peterson's pond	100
Ramsey's pond	100
Texico, Crescent Pond	100
Tularosa, Silver Lake	200
Vermigo Park, Adams Lake	300
New York:	
Dover Plains, Lake Ellis	100
Great River, Timber Point Pond	100
Middletown, Wallkill Creek	400
New Windsor, Walker's lake	100
North Carolina:	
Carthage, Hannon's pond	150
Durham, Ellis's pond	75
Fayetteville, Cross Creek	50
Mollett Pond	50
Hendersonville, Lily Pond	150
Mebane, Lake Weda	75
White Pond	75
Salisbury, Josey's pond	75
Star, Hursey Spring Pond	150
Wake Forest, Walthonia Fish Club Pond	385
Weldon, Gooch's pond	75
Ohio:	
Bidwell, Jones's pond	100
Blanchester, Reeves's pond	100
Chardon, Charlotte Pond	150
East Palestine, Freed's pond	200
Fremont, Sandusky River	500
Ironton, Howell's pond	100
Kansas, Feasel Quarry Pond	100
Marion, Whetstone River	250
Springfield, Little Miami River	300
Summit, Summit Lake	200
Wickliffe, Morris Reservoir	100
Oklahoma:	
Chickasha, Harness Pond	150
Crescent, Crescent Lake	50
Osborn's pond	50
Elgin, Glenn Pond	150
Guthrie, Hawley's pond	142
Highland Lake	141
Red Lake	142
Hillsdale, Coldwater Creek	50
Lawton, Markeson's pond	250
Marlow, Jorgeson Pond	100
Newkirk, Lake Vanderpool	100
Santa Fe Lake	50
Okeene, Seigfreid's pond	50
Perry, Clear Lake	50
Watson's pond	50
Willet's pond	50
Ponca, Bell Lake	50
South Coon Creek	50
Purcell, Brewer's lake	30
Tryon, Bermuda Lakes	50
Wanette, Laughlin's pond	100
Weatherford, Bear Creek Pond	30
Pennsylvania:	
Birdsboro, Hay Creek	200
Bushkill, Delaware River	1,200
Indiana, Yellow Creek	300
Marion, Back Creek	400

Details of Distribution of Fish and Fish Eggs—Continued.

ROCK BASS—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Pennsylvania—Continued.	
Marion, Conococheague Creek	400
Rowlands, Lackawaxen River	600
Weissport, Big Creek	300
Rhode Island:	
Barrington Center, Wood's pond	200
South Carolina:	
Blacksburg, Bear Creek	100
Clover, Camp Run	100
Greenwood, Curltail Creek	100
Little Curltail Creek	100
Ridgeway, Hobby Lake	100
Rock Hill, Spring Ponds	200
Spartanburg, Moore's pond	100
Starr, Branch Pond	100
Westminster, Branch Lake	100
Woodruff, James Creek Pond	100
Yorkville, Hart's pond	200
McNeil's pond	200
Tennessee:	
Chattanooga, Chickamauga Creek	200
Concord, Pepper's pond	200
Gibson, Estes's pond	100
James's pond	100
McMinnville, Sink Creek	400
Murfreesboro, Stones River	400
Paris, Russell's lake	100
Sparta, Cave Spring Pond	100
Watauga Point, Buffalo Creek	500
Texas:	
Alpine, Jackson's pond	100
Anson, Hendrick's lake	40
Aquilla, Vaughan's lake	75
Blum, Mirror Lake	50
Bowie, Waggoner Pond	50
Celina, Gearhart's pond	60
Chico, Largent's lake	40
Comanche, Highland Lake	150
Cooledge, Hardeman's pond	50
Trinity and Brazos Valley Lake	100
Crawford, Railroad Lake	100
Cushing, Kinney's pond	50
Datura, Pritchard's pond	50
Dublin, Johnson's pond	50
Easterly, Easterly's pond	75
Edgewood, Brier Springs	75
Fairlie, Martingin Pond	50
Franklin, Cedar Creek, West Fork	150
Duncan's pond	75
Love's pond	100
Grapevine, Crowley's pond	100
Texas—Continued.	
Grapevine, Hicks's pond	50
Greenville, Birdsong Lake	100
Swan Pond	40
Haskell, Cunningham's pond	100
Shook's pond	50
Hico, Gilmore Creek	50
Joshua, Stephen's pond	200
Linden City, Dean's pond	50
Lufkin, Melville Delta Pond	100
Marfa, Barrel Springs Pond	50
Mineola, Conger's pond	100
Mount Vernon, Gardner's pond	50
Smith's pond	75
Palestine, Spring Lake	100
Park Springs, Plum Pond	30
Rotan, Lake Cottonwood	100
Tuxedo, Davis Lake	25
Waco, Fleming's pond	75
Winchell, Hoghland's pond	150
Winnsboro, Beggs's pond	200
Wolf City, Jones's pond	50
Utah:	
Lund, Bur Oak Spring Pond	100
Virginia:	
Bumpass, Hill's pond	150
Danville, McGuire's pond	300
Hewlett, Duke's pond	200
Hurt, Dawson's pond	200
Nace, Brugh's pond	150
Natural Bridge, Cedar Creek	1,000
Orange, Macon Spring	100
Salem, Roanoke River	600
Scottsville, Moon's pond	600
Totier Creek Pond	600
South Hill, Ferguson's pond	200
Spout Springs, Webbs Pond	150
Stuart, Mothers Home Pond	200
Tazewell, Wimmer's pond	250
Walkers Station, Vaidens Mill Pond	600
Winchester, Back Creek	250
Opequon River	250
Woods Cross Roads, Valley Front Pond	150
West Virginia:	
Bruceton Mills, Kelley's pond	450
Fairmont, Little Lakes	650
Fort Gay, Sweet Lake Pond	200
Wellsburg, Cross Creek	500
Wyoming:	
Sheridan, Cut Off Pond	300
Total[a]	66,035

WARMOUTH BASS.

Disposition.	Fingerlings, yearlings, and adults.
Georgia:	
Chamblee, Jones's pond	40
Maryland:	
Mountain Lock, Potomac River	752
Total	792

[a] Lost in transit, 7,360 fingerlings.

Details of Distribution of Fish and Fish Eggs—Continued.

SMALL-MOUTH BLACK BASS.

Disposition.	Fry.	Finger-lings.
Arkansas:		
Newport, Gamble Lake		2,000
Watson Lake		2,000
Warren, Eagle Creek		2,500
Saline River		2,500
Connecticut:		
Wauregan, Moosup Pond	1,500	
Quinebaug River	1,500	
Illinois:		
Anna, Fairground Lake		1,000
Bloomington, Heafer Lake		150
Momence, Kankakee River		500
Naperville, Du Page River, West Branch		200
Wilmington, Kanakee River		10,000
Indiana:		
Angola, Bass Lake	1,000	
Big Center Lake	1,000	
Buck Lake	1,000	
Clear Lake	1,000	
Elston Lake	1,000	
Failing Lake	1,000	
Fox Lake	1,000	
Hog Lake	1,000	
Lake James	1,000	
Lake Jimmerson	1,000	
Little Silver Lake	1,000	
Marsh Lake	1,000	
Middle Center Lake	1,000	
Pigeon Lake	1,000	
Silver Lake	1,000	
Snow Lake	1,000	
Batesville, Little Laughery Creek		180
Bedford, Quarry Pool		500
Bloomfield, Richland Creek		250
Columbia City, Round Lake		300
Corydon, Big Indian Creek		1,500
Fort Wayne, Cedar Creek		1,000
Dunton Lake		1,000
Lake James		1,000
Maumee River		1,000
St. Joseph River		1,000
St. Marys River		700
Viberg Lake		1,000
Georgetown, Big Indian Creek		2,000
Goshen, Goshen Mill Pond		300
Greencastle, Big Walnut River		1,000
Deer Creek		1,000
Little Walnut River		1,000
Indianapolis, Eagle Creek		2,540
Fall Creek		2,540
School Creek Pond		300
White River		3,240
Lagrange, Royer River		225
Laporte, Pine Lake		300
Monticello, Monon River		345
Tippecanoe River		375
New Albany, Silver Creek		300
Pendleton, Fall Creek		150
Ray, Clear Lake		300
Rome City, Sylvan Lake		375
Shelbyville, Big Blue River		2,000
Kentucky:		
Cadiz, Caney Creek		2,000
Little River		2,000
Muddy Fork Creek		2,000
East View, Nolin River		2,500
Franklin, Sharps Creek		900
Winchester, Goff's lake		1,500
Maine:		
Fryeburg, Kezar Pond	1,600	
Winthrop, Lake Annabessacook	1,500	
Lake Maranocook	4,500	
Maryland:		
Cropley, Potomac River	4,000	
Hagerstown, Potomac River	12,000	
Mountain Lock, Potomac River		1,000
Maryland—Continued.		
Phoenix, Great Gunpowder River	2,000	
Pinesburg, Potomac River	12,000	
Turnpike, Red Run	1,000	
Massachusetts:		
Congamond, Congamond Pond	750	
Halifax, Stetson Pond	900	
Kingston, Big Indian Pond	900	
Northampton, Highland House Lake	750	
Onset Junction, Flax Pond	900	
Webster, Peter Pond		300
Webster Lake		300
Woods Hole, Watcha Pond	900	
Michigan:		
Alpena, Long Lake	6,000	
Au Sable, Cedar Lake		400
Burr Oak, Hog Creek Lake	3,000	
Clare, Bass Lake	1,500	
Geroux Lake	1,500	
Lake Dewey	1,500	
Lily Lake	1,500	
South Lake	1,500	
Stevenson Lake	1,500	
West Lake	1,500	
Clarion, Walloon Lake	10,000	
Clyde, Fish Lake	1,500	200
Comins, Churchill Lake		400
Dryden, Seven Ponds	1,500	
Youngs Lake	1,500	
East Tawas, Bass Lake	3,000	1,000
Empire, Glen Lake		400
Lake Florence		400
Evart, Garvison Pond		400
Fowlerville, School Lot Lake		400
Gaylord, Otsego Lake		1,000
Gogebic, Gogebic Lake		300
Harrisville, Cedar Lake	3,000	
Hubbard Lake	3,000	400
Hart, Round Lake		400
Silver Lake		400
Hastings, Clear Lake	3,000	
Leach Lake	3,000	
Long Lake	3,000	
Middle Lake	3,000	
Pine Lake	3,000	
Hillman, Valentine Lake	3,000	
Hillsdale, Baw Bees Lake	3,000	
Holly, Dickson Lake	1,500	
Fish Lake	1,500	
Ironwood, Beatons Lake		600
Langsford Lake		800
North Lake		400
Rowe Lake		600
Triplett Lake		400
Wolf Lake		800
Kingsley, Hogsback Lake	2,000	
Munsey Lake	2,000	
Rennie Lake	2,000	
Spider Lake	2,000	
Lake George, Lake George	1,500	
Shingle Lake	1,500	
La Rocque, Lake May	3,000	
Lewiston, Twin Lake		1,000
Lincoln, McNally Lake	3,000	
Trask Lake	3,000	
Lupton, Sage Lake		400
Mears, Silver Lake		400
Middleville, Thornapple River	3,000	
Millersburg, Barnhart Lake	3,000	
Montague, Big Blue Lake		400
Muskegon, Big Black Creek		400
Newaygo, Sylvan Lake		400
Oden, Crooked Lake	5,000	
Omena, Dougherty Lake		400
Orchard Lake, Cooley Lake	3,000	
Long Lake	3,000	
Orion, Lake Orion	3,000	

Details of Distribution of Fish and Fish Eggs—Continued.

SMALL-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Michigan—Continued.		
Pentecost, Sand Lake	2,800	
Pentwater, Pentwater Lake		400
Rose Center, Mungers Lake		200
North Buckhorn Lake	1,500	
South Buckhorn Lake	1,500	
St. James, Barney Lake		400
Shelbyville, Gun Lake	4,500	
Topinabee, Mullet Lake		1,000
Twin Lake, Wallace Lake		400
Watersmeet, Bass Lake		300
Crooked Lake		300
Witch Lake, Long Lake		300
New Hampshire:		
Claremont, Rocky Bound Pond	750	
Peterboro, Cunningham Pond	1,500	
Pittsfield, Jenness Pond	1,500	
New Jersey:		
Blackwood, Blackwood Lake		200
Branchville, Culver Lake		200
Lambertville, Lambertville Reservoir		100
Sewell, Chestnut Branch		125
Sunset Lake		125
Sterling Forest, Greenwood Lake		150
Sussex County, Lake Grinnell		100
New York:		
Auburn, Owasco Lake		500
Batavia, Godfrey Pond		40
Horseshoe Pond		40
Tonawanda Creek		200
Binghamton, Susquehanna River		40
Broadalbin, Kennyette Creek	5,000	
Cambridge, Crystal Lake	5,000	
Dead Pond	5,000	
Lake Lauderdale	5,000	
School House Pond	5,000	
Fort Edward, Glen Lake	5,000	
Highland, Long Pond	2,000	
Johnstown, Caroga Lake	5,000	
East Caroga Lake	5,000	
Mud Lake	5,000	
Kingston, Mohonk Lake	2,000	
Mohonk Reservoir	2,000	
Middletown, Wallkill Creek		34
Pelham, Hutchins Pond		150
Schenectady, Mariaville Lake	5,000	
State Line, Queechy Lake	2,000	
Troy, Hudson River		400
Water Mill, Howedona Lake		300
West Point, Brooks Pond	2,000	
Yonkers, Grassy Sprain Lake		300
North Carolina:		
Hendersonville, Lake Wajaw		200
Mortimer, Johns River		150
Mulberry Creek		200
Wilson Creek		150
Ohio:		
Columbus, Alum Creek	1,500	200
Black Lick Creek	1,500	
Deer Creek	1,500	
Hayden Run	1,500	
Little Darby Creek	1,500	
Olentangy River	1,500	400
Rocky Fork Creek	1,500	
Scioto River	1,500	
Dayton, Mad River	3,000	
Miami River	3,000	
Stillwater River	3,000	
Delphos, Auglaize River	1,500	
Germantown, Big Twin Creek	3,000	
Marietta, Muskingum River		400
Newark, Raccoon Creek		600
Pleasant Hill, Stillwater River	1,500	
Portsmouth, Millbrook Park Lake		400
Ohio—Continued.		
West Milton, Stillwater River	1,500	
Zanesville, Muskingum River		400
Oklahoma:		
Wyandotte, Sycamore Creek		200
Pennsylvania:		
Arcola, Perkiomen Creek		68
Carbondale, Crystal Lake		40
Newton Lake		40
Water Company Dam		40
Collegeville, Skippack Creek		50
Greenville, Shenango River		40
Harrisburg, Conedoguinet Creek		70
Kratz, Perkiomen Creek		50
Lebanon, Big Swatara Creek		70
Farlings Creek		45
Indian Town Creek		70
Klines Dam		70
Lake Conewago		70
Little Swatara Creek		70
Lowdermilk Dam		70
Mish Mill Dam		70
Mount Gretna Lake		70
Raccoon Creek		45
Stavers Mill Pond		70
Stover Lake		70
Weidman Dam		70
Woomers Mill Pond		70
Lenape, Brandywine Creek		68
Oil City, Allegheny River		50
Palm, Hosenack Lake		68
Leiberts Dam		50
Pottstown, Manatawany Creek		50
Scranton, Cobbs Pond		50
Moosic Lake		50
Susquehanna, Butler Lake		40
Comfort Lake		40
Susquehanna River		40
Troy, Sugar Creek		40
West Chester, Sharples' lake		50
Wheelerville, Elk Lake		40
Rhode Island:		
Kingston, Long Pond	1,500	
Tucker Pond	1,500	
White Pond	1,400	
Tennessee:		
Denver, Trace Creek		6,000
McEwen, Hurricane Creek		3,000
Waverly, Hurricane Creek		7,000
Vermont:		
Barnet, Martins Pond	6,000	
Wardens Pond	6,000	
Concord, Halls Pond	4,000	
Danville, Keeser Pond	5,000	
Groton, Lake Groton	6,000	
Lunds Pond	6,000	
Lyndonville, Bean Pond	5,000	
Institute Pond	10,000	
Miles Pond, Miles Pond	4,000	
North Troy, Upper Missisquoi River		300
Passumpsic, Passumpsic River	750	
Poultney, Lake St. Catherine	5,000	
Rutland, Lake Bomoseen	10,000	
West Danville, Joe's pond	5,000	
Wolcott, Wolcott Pond	5,000	
Virginia:		
Ashby, Shenandoah River		350
Covington, Potts Creek		200
Danville, Clarks Pond	3,000	
McGuires Ponds	8,000	
Drewrys Bluff, Falling Creek	9,000	
Loudoun County, Potomac River	24,000	
Millboro, Cow Pasture River	12,000	
Nathalie, Brown Pond	3,000	
Orange, Sharon Lake	1,000	
Petersburg, Club Pond	3,000	

Details of Distribution of Fish and Fish Eggs—Continued.

SMALL-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Virginia—Continued.		
Petersburg, Woody Pond	6,000	
Providence Forge, Mirror Lake	12,000	
Relee, Relee Lake	1,000	
Remington, Rappahannock River	2,000	
Richmond, Falling Creek Pond	3,000	
Rockfish, Rockfish Pond	1,000	
Rockfish River	2,000	
Warrenton, Cedar Run		300
Washington:		
Bellingham, Lake Wildwood		100
Loon Lake, Loon Lake		100
Spokane, Liberty Lake		100
Tacoma, American Lake		100
West Virginia:		
Capon Springs, Great Cacapon River	45,000	
Harpers Ferry, Potomac River		1,200
Renick, Cuberson Creek	9,000	
Greenbrier River	24,000	
West Virginia—Continued.		
Roncevert, Greenbrier River		800
Sistersville, Middle Island Creek		100
Springfield, Potomac River, South Branch	15,000	
Wisconsin:		
Armstrong Creek, Lake Gordon		300
Lake Hilbert		300
Cisco, Lake Tenderfoot		300
Harshaw, Hancock Lake		300
Hayward, Round Lake		800
Hurley, Bear Lake		400
Okauchee, Okauchee Lake		498
Princeton, Fox River		300
Sobieski, Bass Lake		300
Soperton, Otter Lake		300
Spider, Spider Lake		500
State Line, Little Bass Lake		300
Total[a]	537,400	109,986

LARGE-MOUTH BLACK BASS.

Disposition.	Fry.	Fingerlings.
Alabama:		
Montgomery, Brick Yard Lake		1,000
Whetstone Lake		2,000
Seale, Evans's pond		2,000
Arizona:		
Flagstaff, Lake Mary		300
Tucson, Cienga Creek		300
Arkansas:		
Bearden, Crystal Lake		150
Bentonville, Sugar Creek		500
England, Clear Lake		400
Fairfield, Atkins Lake		350
Helena, Blue Hole		1,000
Long Lake		1,800
Mississippi River		7,323
Hope, Moses's lake		100
Sandy Bois d'Arc River		250
Lake Village, Lake Chicot		1,150
Lancaster, Frog Bayou		500
Little Rock, Asylum Pond		100
Mammoth Spring, Strawberry Creek		500
Warm Fork		300
Mena, Big Brushy Creek		300
Big Fork Creek		350
Carter Creek		300
Clear Creek		350
Cossatot River		300
Dallas Creek		300
Irons Fork River		300
Jansen Lake		300
Little Brushy Creek		300
Little Missouri River		350
Little Rock Creek		300
Mountain Fork River		300
Ouachita River		600
Prairie Creek		300
Two Mile Creek		300
Paris, College Lake		500
Rosboro, Caddo Pond		100
Scott, Old River		540
Thornton, Pine Lake		125
Upland, Brazeal's pond		30
Colorado:		
Boulder, Pitts' pond		150
Denver, Holliday's lakes		150
La Jara, Laguna Escondida		480
La Junta, Holbrook Reservoir		1,000
Lamar, King Lake		320
Neegrando Lake		320
Colorado—Continued.		
Lamar, Neenoshe Lake		320
Neeskah Lake		320
Neesopah Lake		320
Parrish's lake		320
Thurston Lake		320
Thurston Reservoir		320
Littleton, Springer's pond		300
Manzanola, Lewis' reservoir		450
Pueblo, Squirrel Creek Reservoir		100
Rifle, Bear River		150
Grand River		300
Connecticut:		
Coscob, Pipestave Lake		250
Danbury, Bradley's pond		225
Weekapeeka Lake		300
East Hampton, Pocotopaug Lake		400
Goodspeeds, Bashan Lake		390
Higganum, Higganum Reservoir		300
New Canaan, Lake Waccobuc		200
North Stonington, Wyassup Lake		390
Waterbury, White Oak Pond		260
Weathersfield, Goff Pond		250
Delaware:		
Milton, Parkers Pond		300
Parker Run		100
Teall Mill Pond		200
District of Columbia:		
Washington, Central Station Aquarium		150
Florida:		
Ehren, Muller's pond		500
Lake Como, Lake Como		500
Ocala, Fry Lake		2,000
Orlando, Smith's lake		500
Sanford, Lake Bertha		500
Santos, Lake Madonna		500
Sorrento, Lake Lucy		1,000
Georgia:		
Douglas, Peterson's ponds		1,750
Greenville, Powers Hill Pond		1,500
Groveland, Cannochee River		1,000
Lake Park, Long Pond		1,000
Ocean Pond		500
Marietta, McKenzie's pond		500
Mayfield, Cason's pond		100

[a] Lost in transit, 3,319 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Georgia—Continued.		
Millen, Buck Head Creek		1,000
Ogeechee River		1,000
Oglethorpe, Buck Creek		750
Talbotton, Williams Pond		250
Tifton, Hale's pond		500
Valdosta, Loch Laurel		500
Vienna, Heard's pond		250
Idaho:		
Nampa, Lake Lowell		250
Priest River, Lees Pond		100
Illinois:		
Antioch, Lake Marie		1,200
Aurora, Fox River		900
Belleville, Biebel's pond		250
Fourmile Club Lakes		200
Beech Ridge, Cache River		550
Brighton, Kelsey's pond		300
Montgomery Lake		250
Cairo, Cache River		550
Campus, Factory Pond		500
Carbondale, Cox's lake		200
Manning Pond		800
Mine Pond		800
Spillers Lake		300
Thompsons Lake		400
Carter, Wellman's lake		300
Carterville, Brandon Pond		100
Carroll's pond		300
Carter Pond		150
Coleman Pond		175
Colp and Arnold Lakes		150
Ferrell Pond		150
Hofer Lake		100
Zimmerman's lake		350
Chester, Crisler's pond		350
Fishing Club Lake		300
Clay City, Doherty's pond		100
Crainville, Norton's pond		100
Crystal Lake, Crystal Lake		800
Dallas City, Mississippi River		900
Decatur, Club Lake		80
Franklin, Burlington Reservoir		300
Freeburg, Freeburg Lake		200
Walnut Grove Pond		500
Glenwood, Glenwood Pond		1,000
Grays Lake, Gages Lake		1,000
Herrin, Cambon Pond		300
Egyptian Pond		450
Homewood, Calumet River		500
Kankakee, Iroquois River		1,200
Kankakee River		1,200
Kansas, Hallock's lake		200
Kewanee, Sans Souci Lake		750
Makanda, Roberts's pond		100
Marion, Hart's pond		175
Keystone Pond		150
Schwerdt's lake		400
Water Works Lake		150
Modoc, Bersche's pond		200
Mulberry Grove, Hudson Pond		300
Murphysboro, Stacher Lake		200
Naperville, Du Page River, East Branch		1,000
Stone Quarry Lake		450
O'Fallon, Henrys Lake		400
Olney, Olney City Reservoir		400
Richmond, Lake Elizabeth		800
Riverside, Des Plaines River		900
Sandusky, Round Pond		100
Shepherd, Sni E'Carte River		600
Sterling, Sinsippi Lake		900
Ullin, Cache River		550
Utica, Fourth Quarry Pond		450
Vandalia, Kaskaskia River		500
Virden, Maple Avenue Lake		300
Waterloo, Bissell Lake		600
Woodberry, Woodberry Lake		500
Indiana:		
Anderson, Bayview Pond		400
West Brook Pond		300
Claypool, Caldwell Lake		250
Simon Shultz Lake		200
Yellow Creek Lake		250
Corydon, Big Indian Creek		300
Elbert's lake		100
DeLong, Tippecanoe River		700
Eaton, Hamilton's pond		125
Fort Wayne, Lake Emily		300
Indianapolis, Eagle Creek		100
Fall Creek		200
Nesom's pond		75
White River		200
Jasper, Calumet Lake		300
Schmitt's pond		100
Kendallville, Bixler Lake		200
Liberty, White Water River, East Fork		375
Macy, North Mud Lake		400
South Mud Lake		400
Monticello, Big Metamonong Creek		300
Tippecanoe River		300
New Albany, Silver Lake		40
North Liberty, Rupel Lake		300
Owensville, Stone's pond		100
Paoli, Brookside Reservoir		100
Pierceton, Webster Lake		200
Richmond, Rettig Lake		50
Rockville, Little Raccoon Creek		435
Rome City, Lower Lake		400
Sylvan Lake		800
Stewartsville, Footes Lake		200
Summitville, Roseboom's pond		200
Warren, Salamonie River		400
Iowa:		
Bentley, Walnut Hill Pond		125
Cedar Falls, Cedar River		400
Hacketts Lake		400
Chariton, McCoy's pond		100
Rice Lake		600
Charles City, Cedar River		400
Chester, Upper Iowa River		800
Clarion, Elm Lake		400
Coggon, Buffalo Creek		400
Corning, Lake Vernon		100
Decorah, Upper Iowa River		400
DeWitt, Crystal Lake		400
Silver Creek		200
Edgewood, Funk's pond		150
Forest City, Imogene Lake		150
Glenwood, Glenwood Park Lake		700
Hampton, Reed Lake		400
Independence, Wapsipinicon River		400
Lime Springs, Upper Iowa River		2,250
Manchester, Maquoketa River		7,100
Marble Rock, Shell Rock River		400
Maynard, Little Volga Creek		300
North McGregor, Mississippi River		5,250
Tuskeego, Robertson's pond		100
Kansas:		
Belmont, Bentley's pond		100
Blue Rapids, Big and Little Blue River		300
Bronson, Second Lake		100
Caldwell, Fall Creek		500
Chanute, Valley View Pond		100
Cherryvale, City Lake		300
Colony, Clark's pond		125
Conway Springs, Slate Creek		300
Farlington, Mitchell's pond		125
Huron, Anthony's pond		225
Isabel, Gibson's pond		100

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Finger-lings.
Kansas—Continued.		
Kansas City, Idlewild Lake		100
Kingman, Harris Springs Pond		200
Reed's pond		100
Leavenworth, Fairgrounds Lake		150
Marion, Catlin Creek		250
Clear Creek		250
Cottonwood River, South Fork		250
Middle Creek		250
Mud Creek		250
Willowbrook Pond		100
Medicine Lodge, Chapin Ponds		125
Currie Lake		125
Read Lake		250
Silver Springs Lake		250
Melvern, Long Creek		250
Peabody, Cotton Creek		100
Country Club Lake		250
Crisfield Pond		250
Doyle Creek		350
Gray's pond		250
Henry Creek		250
Johnson's pond		100
Rock Island Lake		250
Spring Creek		350
Townsend's pond		250
Pittsburg, Sporting Club Ponds		125
St. Francis, Spring Creek		75
Selden, Prairie Dog Creek		325
Tyro, Brick Company's lake		150
Waverly, Rock Creek		200
Wilder, Woodson's pond		100
Yates Center, Waterworks Reservoir		250
Kentucky:		
Anchorage, Cox Lake		150
Pryor's pond		75
Augusta, Licking River, North Fork		80
Bonnieville, Riggs's pond		75
Campbellsburg, Little Kentucky River		200
Ekron, Horse Lot Pond		100
Woods Pond		100
Yellow Lake		100
Elizabethtown, Cedar Creek		80
Nolin River		80
Rauboldt Pond		40
Valley Creek		80
Youngers Creek		80
Eminence, Thorne's pond		75
Glasgow, Beard Pond		75
Boyds Creek		200
Fallen Timber Creek		200
Peters Creek		150
Richardson Pond		100
Skeggs Creek		200
South Fork Creek		75
Glendale, Nolin Creek		150
Hodgensville, Nolin Creek		80
La Grange, Highland Lake		150
Lebanon, Big Pond		75
Cheyels Creek		75
Indian Creek		75
Peeps Creek		150
Rolling Fork Creek		150
Rolling Fork Creek, North Branch		150
Rolling Fork Creek, South Branch		150
Louisville, Green's pond		80
Lake Lansdowne		195
Parkview Club Lake		80
South Park Lake		160
Wagner's pond		80
Kentucky—Continued.		
Stephensburg, Blue Lake		200
Stephensburg Lake		200
Williamsburg, Jellico Creek		300
Louisiana:		
Athens, Dullon Pond		100
Benton, Sunnyside Pond		100
Bogalusa, Bogalusa Pond		250
Bowie, Hill Pond		50
Broussard, Hazard Pond		25
Clinton, Gallent's pond		100
Edgerly, Chesson's pond		50
Jeauerette, Albania Pond		75
Lake Charles, Brickyard Pond		25
Laurel Hill, Rose Mound Lake		150
Lillie, Pin Oak Pond		30
Marthaville, Huff's pond		100
Rustin, Lyles's pond		125
Maine:		
Boothbay Harbor, Pine Lake		450
Redfield, Parker Pond		155
Maryland:		
Abell's Wharf, Forbes Pond		150
Alesia, Big Gunpowder River		320
Gunpowder Falls		180
Baltimore, Severn River		280
Brunswick, Potomac River		130
Cumberland, Potomac River		160
Wills Creek		80
Easton, Peach Blossom Creek		150
Freeland, Rock Dale Ponds		280
Gwynnbrook, Gwynn Brook		100
Hagerstown, Antietam Creek		150
Conococheague Creek		200
Potomac River		400
Hampstead, Patapsco River, North Branch		340
Hoods Mill, Patapsco River		270
Lambson, Sassafras River		300
Massey, Swan Branch		150
Mountain Lock, Potomac River		440
Phoenix, Gunpowder River		140
Riverdale, Anacostia River		100
Rocky Ridge, Monocacy River		300
Salisbury, Wicomico River		200
Taneytown, Goulden's pond		80
Woodstock, Patapsco River		360
Massachusetts:		
East Dedham, Mather Brook Pond		250
Fall River, Laurel Lake		390
Falmouth, Morse Pond		250
Greenfield, Deerfield River		1,560
Wareham, Big Sandy Pond		400
Little Sandy Pond		400
West Gloucester, Haskell's pond		390
Michigan:		
Alpena, Grand Lake		350
Crystal Falls, Fortune Lake		200
Lake Mary		200
Mud Lake		200
Edwardsburg, Morn Creek		350
Greenville, Flat River		1,000
Tufk Lake		200
Hanover, Crispell Lake		150
Farewell Lake		150
Fox Lake		100
Hart, Juniper Pond		175
Ironwood, Long Lake		400
Mosquito Lake		400
North Lake		200
Pomeroy Lake		400
Round Lake		200
Silver Lake		400
Sutherland Lake		400

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Michigan—Continued.		
Ironwood, Tamarack Lake		400
Taylor Lake		400
Ishpeming, Silver Lake		400
Kingsley, Hogsback Lake		375
Rennie Lake		375
Oakley, Shiawassee River		200
Oden, Crooked Lake		700
Schoolcraft, Weed Lake		175
Sylvania, Katherine Lake		200
West Bear Lake		200
Turtle, African Lake		400
Clover Leaf Lake		200
Eel Lake		200
Emiline Lake		200
Gaylord Lake		200
Hawk Lake		400
Honey Moon Lake		400
Independence Lake		400
Line Lake		400
Mint Lake		200
Moose Lake		400
Orms Lake		400
Rowes Lake		400
Toe Lake		200
Minnesota:		
Alexandria, Darling Lake		200
Lake Agnes		150
Lake Carlos		700
L'Hommedieu Lake		300
Brownsville, Mississippi River		3,000
Duluth, White Lake		400
Kelsey, Lake Rauppe		450
Mankato, Lake Washington		400
Minneapolis, Burnett's lake		300
Pengilly, Swan Lake		900
Preston, Root River		600
Root River, Middle Branch		600
Rochester, Zumbro River, Middle Branch		200
Zumbro River, South Branch		200
St. Paul, State Fish Commission		18,250
South Haven, Augusta Lake		400
Betsy Lake		400
Lake Caroline		400
Stewartsville, Lake Florence		500
Root River		600
Mississippi:		
Aberdeen, Dead Lake		25
McNiece Lake		300
Medor Lake		600
Tombigbee River		275
Ackerman, Willow Pond		200
Agricultural College, McKell's pond		100
Bexley, Leatherberry Mill Pond		75
Mill Pond		75
Biloxi, Howell Pond		75
Lorenzo Pond		75
Brandon, Raymond Pond		100
Canton, Factory Pond		100
McBride Pond		100
Round Lake		100
Columbus, Lake Katherine		300
Corinth, Bridge Creek		200
Cane Creek		300
Chambers Creek		300
Clear Creek		200
Clear Lake		150
Conway Lake		200
Coon Creek Pond		200
Derryberry Lake		100
Elams Creek		150
Griffins Pond		150
Gum Pond		200
Mississippi—Continued.		
Corinth, Lambert's lake		150
Long Pond		150
Marlows Mill Pond		100
Parmitchie Creek		200
Romine and Ward Pond		150
Santa Fe Lake		150
Seven Mile Creek		200
Tuscumbia River		300
Utley Mill Pond		150
Waukomis Lake		300
Wilson's pond		100
Dancy, Barefoot's pond		100
McCarter's pond		150
Smith's pond		150
Walker's pond		100
White's pond		150
Wilson's pond		100
Durant, Smith's pond		200
Friars Point, Moon Lake		250
Houlka, Reed's pond		25
Houston, Busby's pond		150
Knox Pond		50
Howells Switch, Rankin Pond		400
Jackson, Curry's pond		300
Farish Pond		150
Lewis's pond		100
Lynch's pond		150
Morrison's pond		150
Richmond Lake		300
Spring Lake		300
Tapley's pond		150
Lee County, King Creek		650
McCool, Fancher's pond		300
Lily Pond		150
Sweet Gum Lake		150
McDonald, Majure's pond		25
Ogletree's pond		25
Smith's pond		25
Maben, Butler's pond		150
Macon, Eiland Pond		150
Howards Lake		200
Madison Station, Glenarchen Pond		100
Mantee, Lofton's pond		150
Moseley Pond		200
Taylor's pond		150
Meridian, College Lakes		300
Pleasant Springs		45
Queen City Club Pond		200
New Albany, Conner's pond		200
New Houlka, Chuquatonchee Creek		150
DeLashmet Lake		150
Houlka Creek		300
Reed Pond		200
Okolona, Elliott Pond		200
Mill Pond		200
Okolona Lake		200
Red Bud Creek		150
Sansom's lakes		600
Osborn, Montgomery's pond		100
Oak Grove Pond		100
Pearson, Sweetwater Lake		200
Philadelphia, Wilson's pond		50
Pickayune, Tate's lake		75
Ripley, Morgan's pond		25
Sallis, Temple's pond		200
Sessums, Ash Creek Pond		100
Gay's pond		100
Rush's pond		100
Wild's pond		100
Shuqualak, Belle Pond		200
Dugan Pond		100
Hamilton's pond		100
Jenkins' pond		70
Woodlawn Pond		200

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Mississippi—Continued.		
Starkville, Harmon Lake		200
Johnson's pond		100
McPherson Lake		100
Reynolds Lake		100
Richey's pond		100
Wade's pond		150
Washington's pond		100
Strongs, Cox Branch		100
Lake Artecore		100
Tofulla Creek		200
Sturgis, Hutchinson Pond		100
Summit, Godbold's lake		250
Toomsuba, Live Oak Lake		35
Tupelo, Mill Pond		100
Park Lake		300
Wiygul's lake		150
Union, Johnson's pond		25
West Point, Evans Pond		150
Tibbee Lake		300
Tipton's pond		150
Yazoo City Cedar Grove Pond		150
Missouri:		
Asbury, Blackberry Creek		200
Aurora, Flat Creek		300
Bolivar, Pomme de Terre River		400
Brandsville, Lake of the Four Cantons		100
Butler, Lake Katherine		400
Cabool, Piney River		200
Clever, Bailey's lake		200
Estes's pond		400
Clinton, Clinton Lake		300
Cole Camp, Cole Camp Creek		300
Corkney, Niangua River		150
Creve Cœur, Creve Cœur Lake		225
Dedwick, Livingston's pond		100
Deepwater, Dickey Lake		150
Fredericktown, St. Francis River		200
Grand View, Spring Lake		100
Higginsville, Railroad Pond		475
Kansas City, Fairmount Lake		400
Koshkonong, Lake Rowland		100
Knoblick, Little St. Francis Creek		140
Langdon, Langdon Lake		300
Maysville, Dieter's lake		150
Mexico, Railroad Lake		200
Water Works Reservoir		200
Mount Vernon, Truitt Creek		300
Neosho, Crescent Pond		200
Nevada, Railroad Reservoir		200
Noel, Perry's ponds		200
Pleasant Hill, Leonards Lake		500
Richards, Richardson's pond		100
Rolla, Big Beaver Creek		80
Big Dry Fork Creek		150
Little Beaver Creek		100
Little Dry Fork Creek		100
Love Creek		100
McBride Spring Branch		40
Waltz Spring Branch		40
Rosedale, Lewis's pond		40
Springfield, Doling Lake		300
Swope Station, Lagoon Lake		200
Wooded Lake		200
Thayer, Warm Fork Creek		200
Wayne, Woodruff Springs		300
Waynesville, Gasconade River		150
West Plains, Woolworth's bayou		200
White River, North Fork		200
Willow Springs, Willow Springs Reservoir		200
Nebraska:		
Stuart, Clear Lake		200
Nevada:		
Ely, Argus Lake		250
Cleveland Lake		250
New Jersey:		
Ashland, Newtown Lake		300
Boonton, Deckers Pond		400
Collingswood, Newton Lake		600
Denville, Sanitarium Lake		300
Dover, Longwood Lake		500
Shongum Lake		400
Lakewood, Lanes Mill Pond		200
Lambertville, Lower Reservoir		250
Mullica Hill, Mullica Hill Pond		400
Netcong, Bear Pond		200
Ogdensburg, Hawthorne Lake		400
Paterson, Squaw Lake		400
Pennsgrove, Du Pont Pond		100
Layton Pond		350
Pompton Lakes, Pompton Lakes		800
Princeton Junction, Carnegie Lake		500
Rahway, Water Company's reservoir		500
Riverside, Beck's pond		250
Sicklerville, Brooklyn Lake		600
Sewell, Bethel Lake		300
South Vineland, Buckshietem Mill Pond		400
Waterloo, Jefferson Lake		200
Wenonah, Pyle's lake		250
Westwood, Musquapsink Lake		400
New Mexico:		
Artesia, Clark's lake		250
Carlsbad, Pecos River		500
Rocky Arroyo Creek		150
Colfax, Adams Lake		254
Dexter, Bishop's lake		150
Gallup, Ramah Reservoir		300
Hagerman, Ware's reservoir		150
Las Vegas, Buena Vista Lake		280
Santa Fe, Miller's pond		100
Springer, Farmers Reservoir		320
Jaritas Lake		320
Wagon Mound, Santa Clara Creek Reservoir		195
New York:		
Arcade, Crystal Lake		400
Cambridge, Second Pond		400
Craryville, Copake Lake		400
Dover Plains, Lake Ellis		400
East Worcester, Hudson Lake		400
Gloversville, Mountain Lake		400
Greatkills, Shore Acres Pond		150
Greene, Chenango River		400
Greenport, Sills Pond		100
Highland Falls, Roe Park Lake		200
Hudson, Hasbrouck Pond		400
Huntington, Koster's pond		100
Johnstown, Canada Lakes		400
Lockport, Red Creek		300
Middletown, Wallkill River		300
Monticello, Anawana Lake		200
Brown Pond		200
Highland Lake		200
Kiamesha Lake		200
Metock Pond		200
Sacket Lake		200
Sand Pond		200
White Lake		200
Narrowsburg, Half Moon Lake		400
Nunda, Genesee River		400
Raquette Lake, Blue Mountain Lake		400
Eagle Lake		400
Utawana Lake		400
Riverside, Big Pond		500
Bullett Pond		500
Paradox Lake		500

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
New York—Continued.		
Riverside, Schroon Lake		500
Roscoe, Florence Lake		400
Thurman, Echo Lake		400
Ticonderoga, Eagle Lake		400
Walden, Wallkill River		300
Wallkill, Schawangunk River		400
Warwick, Wickham Lake		400
Williamstown, Panther Lake		400
North Carolina:		
Charlotte, Catawba River, North Fork		96
Franklin, Cartoogaja Creek		405
Cullasagee Creek		405
Tennessee River		300
North Dakota:		
Ambrose, Skjermo Lake		300
Annamoose, Round Lake		400
Berlin, Cottonwood Creek		400
Cottonwood Pond		100
Bottineau, Lake Dana		300
Lake McArthur		300
Burnstad, Beaver Lake		400
Buttzville, Buttz's pond		300
Cathay, Rocky Run Lake		300
Cayuga, Anderson's lake		100
Crystal Springs, Crystal Springs Lake		500
Dawson, Lake Isabel		400
Devils Lake, Devils Lake		3,500
Elliott, Lake Elliott		200
Glen Ullin, Antelope Creek		100
Burns Pond		100
Granville, Buffalo Lodge Lake		600
Gwinner, Aliceton Lake		200
Denning's lake		100
Johnson's pond		100
Harvey, Sheyenne Lake		400
Jamestown, James River		10,500
Kenmare, Des Lacs Lake		300
Thompson Lake		300
Lisbon, Bale's pond		200
Sheyenne River		600
Milnor, Storm Lake		600
Nicholson, Jackson Hill Pond		150
Nome, Carlson's pond		100
Pingree, James Lake		400
Pipestem River		1,100
Ray, Beaver Creek		150
St. John, Cameron's lake		300
Jarvis Lake		300
Strium, Medd's pond		100
Ohio:		
Alexandria, Raccoon Creek		50
Aurora Station, Harmon Pond		100
Bradford, Greenville Creek		575
Celina, Mercer County Reservoir		500
Cleveland, Swimming Pond		100
Cloverdale, Myers's pond		100
Covington, Factory Pond		175
Greenville Falls Dam		250
Mohlers Eddy		300
Stillwater River		500
Defiance, Auglaize River		150
Maumee River		150
Findley, Auglaize River		150
Fremont, Sandusky River		400
Georgetown, Sunny Side Lake		50
Hebron, Buckeye Lake		775
Kent, Twin Lakes		300
West Twins Lake		300
Lisbon, Furnace Run		100
Furnace Run Reservoir		100
Nelsonville, Hocking River		200
Newark, Buckeye Lake		425
Newcomerstown, Tuscarawas River		250
New Paris, White River, East Fork		125
Ohio—Continued.		
Newton Falls, Mahoning River		250
Nova, Railroad Reservoir		200
Paulding, Maumee River		500
Portsmouth, Millbrook Park Lake		500
Rarden, Scioto Brush Creek		225
Ravenna, Lake Brady		300
Ripley, Gardner's pond		75
Rock Creek, Grand River		125
St. Marys, Mercer County Reservoir		600
Salem, Crumrine Dam		125
Springfield, Buck Creek		125
Warren, Youngs Run		150
Wauseon, Miller and Becker Pond		295
Woodsfield, Woodsfield Dam		200
Youngstown, Lake Cohassett		125
Lake Katrine		50
Mahoning River		175
Oklahoma:		
Ada, Boggy Lake		250
City Lake		325
Lawrence Lake		175
Radka Creek		250
Ames, Garden Lake		100
Jones's lake		100
Apache, Cache Creek		300
Chandler Creek		400
Gassoway's lake		250
Mission Creek		300
Newcomb Pond		100
Sturman's pond		100
Ta-La Creek		250
Toney Creek		300
Ardmore, Ardmore Club Lake		250
Caddo Creek		200
Club Lake		175
Twin Lake		100
Atoka, City Reservoir		300
Barron Fork, Owl Lake		300
Bernardi, Bogardus Pond		100
Blanchard, Bridge Creek		150
Spring Lake		150
Bliss, Lake 101		150
Ranch Lake		100
Broken Arrow, Prairie Lake		100
Calumet, Mac Lake		125
Carney, Carney Lake		100
Chattanooga, Sunnyside Lake		100
Checotah, Spring Lake		140
Chickasha, Lanier Pond		150
Chilocco, Chilocco Lagoon		100
Crescent, Kelly's pond		100
Devol, Suter's pond		125
Duncan, Bumpass's lake		100
Norvell's pond		125
Elk City, Chambers's lake		100
Lake Coleman		200
El Reno, Club Lake		200
Enid, Clear Lake		250
Gross's pond		250
Spring Lake		250
Eufaula, Lake Buford		140
Faxon, Cuddy Lake		100
Fort Sill, Medicine Bluff Creek		250
Frederick, Ater Lake		125
Glencoe, Lake Louisa		100
North Side Pond		100
Granton, Alfalfa Pond		100
Prairie Pond		100
Willow Pond		100
Guthrie, Ellison Lake		250
Johnson's pond		250
Martin Lake		250
Reddington Lake		250
Twin Lakes		250
Walker Lake		250
Hallett, Mirror Lake		200

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Oklahoma—Continued.		
Haskell, Oputtuna Pond		100
Willows Pond		300
Hennessey, Jarvis's pond		100
Hobart, Elk Lake		150
Hydro, Deer Creek		250
Jet, Saline Valley Pond		100
Kelsey, Illinois River		300
Lawton, Medicine Creek		650
McAlester, Cole's lake		150
Madill, McMillan Lake		125
Marietta, Bills Creek		125
Cochron Creek		250
Corcoran Creek		175
George William Creek		125
Haynes's lake		125
Hickory Creek		250
Kirkpatrick Lake		125
Marietta Club Lake		200
Oil Creek		200
Rock Creek		150
Shegan Creek		125
Simon Lake		150
Marlow, Adkins Pond		100
Boone Pond		100
Cooper's pond		100
Findley's pond		150
Marlow Park Lake		150
Marlow Pond		150
Martin's pond		125
Murray's pond		150
Oquin's lake		150
Sand Hill Pond		200
Shaws Pond		100
Waldbridge Lake		125
Mill Creek, Mill Creek		300
Muskogee, Country Club Lake		300
Newkirk, Santa Fe Lake		250
Ninnekah, Nelson Lake		125
Noble, Clear Brook		125
Wadley's pond		100
Norman, Sunnybrook Lake		150
Ochelata, Water Works Reservoir		200
Okeene, Schallmo Pond		100
Oklahoma City, Belle Isle Lake		300
Club Lake		200
Colcord's lake		250
Elm Lake		125
Hogan's pond		200
Kingkade's lake		250
Lakeview Lake		300
Shepherd's lake		375
Spring Creek		125
Osage, Osage Lake		150
Pawhuska, Clear Creek		350
Pawnee, Walenciak's lake		100
Perkins, Jennings Pond		100
Perry, Beers's lake		200
Bostick's pond		200
Brown's pond		200
Casey's pond		200
City Lake		500
Hansen's pond		200
Hansing's lake		100
Keaton's pond		200
McCune's pond		250
Moore's pond		175
Tucker's pond		125
Ponca, Cottonwood Lake		200
Evans Lake		200
Rockbound Lake		200
Turkey Creek		325
Willow Pond		150
Pond Creek, Fairview Lake		250
Guernsey's lake		250
Oklahoma—Continued.		
Poteau, Long Lake		300
Purcell, Club Lake		300
Ripley, Crain's pond		100
Sallisaw, Sallisaw River		300
Sentinel, Big Elk River		350
Stillwater, Carpenter's lake		100
McKinnon's pond		100
Stroud, Loch Kathrine		125
Sulphur, Lowrance Lake		200
Tahlequah, Wolfe Lake		100
Terral, Rock Island Lake		100
Tishomingo, Big Sandy River		200
City Lake		100
Foley Lake		200
Little Sandy River		250
Trousdale, Livvix's lake		100
Tuttle, Davis's pond		100
Vinita, Electric Park Lake		100
Hall's lake		100
Walter, Johnson's pond		300
Watonga, Cunningham's lake		100
Waukomis, McClennahan's pond		100
Woodward, Reilly's springs		100
Yukon, Maixner's pond		100
Pennsylvania:		
Bath, Spring Reservoir		100
Big Bend, Conewago Creek		300
Fleuent Pond		300
Birdsboro, Hay Creek		350
Brillharts, Codorus Creek, South Branch		420
Bushkill, Deer Lake		300
Forest Lake		300
Lake Taminent		300
Mud Pond		300
Chester Springs, Pickering Creek		300
Collegeville, Willow Hurst Dam		100
Connellsville, Indian Creek		80
Danville, Susquehanna River		175
Susquehanna River, North Branch		150
Denver, Cocalico Creek		250
East Berlin, Conewago Creek		350
Factoryville, Lake Carey		300
Lake Kewanna		300
Lake Manataka		300
Falls Station, Susquehanna River		350
Fort Washington, Sandy Run		200
Gettysburg, Marsh Creek		250
Rock Creek		250
Goldsboro, Susquehanna River		280
Graftesford, Perkiomen Creek		300
Greenville, Shenango River		300
Hanover, Conewago Creek		300
Little Conewago Creek		200
Hatboro, Little Neshaminy Dam		200
Hickory, Allegheny River		350
Huntingdon, Raystown Branch		180
Indiana, Twolick Creek		150
Kimberton, French Creek		300
Lancaster, Conestoga River		300
Mount Morris, Dunkard Creek		1,000
New Oxford, Little Conewago Creek		250
Newtown, Neshaminy Creek		600
Oaks, Perkiomen Creek		200
Skippack Creek		200
Oxford, Octoraro Creek, East Branch		500
Palm, Gehard Dam		100
Hosensack Creek		100
Perkiomen Creek		100
Phillipsburg, Lehigh River		200

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Pennsylvania—Continued.		
Pittsburg, Griffin Reservoir		180
Wildwood Reservoir		270
Pocono, Naomi Lake		300
Pocono Lake		350
Port Royal, Tuscarora Creek		180
Pottstown, Manatawny Creek		150
Rahns, Perkiomen Creek		300
Reading, Angelica Creek		200
Jordan Creek		200
Maiden Creek		250
Schuylkill River		350
Stony Creek		200
Tulpehocken Creek		1,000
Schwenksville, Perkiomen Creek		300
Susquehanna, Susquehanna River		400
Telford, Perkiomen Creek, Northeast Branch		200
Temple, Ontelaunie Creek		300
Troy, Cross Roads Creek		250
North Branch		300
Trunkeyville, Alleghany River		300
Tunkhannock, Lake Carey		800
Union City, Lake Pleasant		350
Warren, Jackson Creek		300
Weissport, Poho Poco Creek		250
West Chester, Park's pond		200
Wrightsville, Cabin Creek		140
Fishing Creek		200
Krentz Creek		200
Susquehanna River		300
York, Beaver Creek		140
Big Conewago Creek		560
Codorus Creek, South Fork		140
Codorus Creek, West Fork		280
Fishing Creek		140
Fox Creek		280
Keesey Dam		140
Kreutz Creek		140
Kreutz Pond		140
Little Badams Creek		280
Little Conewago Creek		140
Susquehanna River		280
York Haven, Big Conewago Creek		280
Conewago Creek		560
Susquehanna River		280
Zieglersville, Perkiomen Creek		300
Rhode Island:		
Kingston, Hundred Acre Pond		520
Westerly, Park Lake		390
South Carolina:		
Aiken, Branch Pond		75
Shaws Creek		500
Anderson, Branch Water Pond		48
Brown Pond		48
Silver Lake		48
Angelus, Middleton's pond		500
Belton, Saluda River		96
Bethune, Estridge's pond		500
Mill Branch Pond		500
Mill Creek Pond		500
Blacksburg, Broad River		1,000
Blaney, Black Lake		1,000
Borden, Pollard Mill Pond		70
Bowling Green, Crowders Creek		500
Crowders Creek, South Fork		1,000
Calhoun, Twenty-three Mile Creek		2,000
Camden, Savage's pond		25
Chester, Sandy River		48
Clinton, Enoree River		500
South Carolina—Continued.		
Clover, Allison Creek		1,000
Beaver Dam Creek		1,000
Bigger's pond		500
Catawba Creek		1,000
Catawba River		2,000
Crowders Creek		4,000
Crowders Mill Pond		1,000
Lower Beaver Dam Creek		1,000
Mill Creek		1,000
Upper Beaver Dam Creek		1,000
Columbia, Cedar Creek		36
Congaree Creek		36
Cotton Mills Reservoir		48
Dents Pond		96
Gin Pond		48
Poplar Branch Pond		36
Rodgers Spring		36
Croft, Bridge Pond		500
Darlington, Charles Mill Pond		500
Easley, Silver Pond		1,000
Eastover, Colonels Creek		1,000
Edgefield, Beaverdam Creek		1,000
Edmund, Thresher Pond		500
Eureka, Seiglers Mill Pond		500
Everett, Hilliard Pond		500
Old Mill Pond		500
Fort Lawn, Abernathy's pond		500
Catawba River		1,500
Crawfords Pond		500
Fishing Creek		1,000
Gilbert, Hamburg Branch		48
Great Falls, Catawba River		1,000
Catawba River Pond		2,000
Rocky Creek		1,000
Southern Power Co.'s pond		1,000
Greenville, Saluda Lake		4,000
Greenwood, Bag Creek		75
Curl Tail Creek Pond		120
Cutler Branch Pond		75
Davis's pond		75
Garys Pond		25
Harrison Creek		75
Johns Creek		75
Little Curl Tail Creek		135
Rays Pond		75
Wardlaws Pond		1,000
Hartsville, Ox Pen Branch		500
Hickory Grove, Bullock Creek		1,000
Honea Path, Broad Mouth Creek		150
Little Creek		75
Little River		75
Mattison Mill Pond		75
Saluda River		75
Turkey Creek		75
Hopkins, Chappelle Creek		1,000
Mill Creek		1,500
Tub Mill Creek		1,000
Inman, Ray's pond		500
Lamar, Harrell Mill Pond		500
Lancaster, Mosier's pond		500
Langley, Power House Pond		150
Laurens, Reedy River		48
Leesville, Lightwood Creek Pond		75
Lightwood Pond		500
Lexington, Gable's pond		500
Marietta, Middle Saluda River		1,500
North Saluda River		2,500

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
South Carolina—Continued.		
Marietta, South Saluda River		1,000
Montmorenci, Runtz Creek		75
Mullins, Buck Swamp		1,000
North Augusta, Walkers Mill Pond		150
Oakvale, Oakvale Lake		25
Orangeburg, Spring Lakes		1,000
Pageland, Black Pond		500
Little's pond		500
Spring Pond		500
Thompson's pond		500
Patrick, Big Juniper Creek		1,000
Pelion, Black Creek		500
Beaver Pond		500
Pickens, Saluda River, South Fork		1,500
Twelvemile River		1,000
Ridge Springs, Flatrock Creek		500
Gunter's pond		500
Rock Hill, Catawba River		2,000
Little Allison Creek		48
St. Matthews, Milwood Pond		500
Zeigler's pond		75
Santuck, Broad River		500
Seivern, Indian Branch		500
Sharon, Bullock Creek		48
Silverstreet, Beaverdam Creek		1,000
Springfield, Goodland Creek Pond		150
Steadman, Barr Pond		500
Gantt's pond		500
Sumter, Cains Mill Pond		150
Pocalla Springs Pond		500
Trenton, Bottis's pond		500
Chevis Creek Pond		500
Pace Run		1,000
Shaws Pond		1,000
Walkers Pond		500
Troy, Clinkscales's pond		25
Cane Creek		1,000
Cuffy Town Creek		1,000
Dowtin's pond		25
Hardlabor River		1,000
Leard's pond		25
Long Cane Creek		3,000
Talbert's ponds		50
Young's pond		500
Union, Buffalo Reservoir		48
Yorkville, Brown's pond		1,000
Catawba River		1,000
Clarks Fork Pond		1,000
Inman's pond		500
Langdon Branch Pond		1,000
Turkey Creek Pond		1,000
Woodruff, Chumley's pond		500
South Dakota:		
Astoria, Oak Lake		300
Bonesteel, Flurams Lake		250
Canton, Big Sioux River		800
Carthage, Lake Magnuson		175
Clark, Antelope Lake		300
Round Lake		300
Dell Rapids, Big Sioux River		400
Forestburg, Watch Lake		125
Kimball, Pleasant Lake		300
Lane, Flowing Wells Lake		175
Lennox, Lake Thorsen		300
Madison, Lake Herman		500
Lake Madison		600
Marion, Center Lake		300
Silver Lake		300
Vermillion River, West Branch		300
Midland, Stafford's pond		125
Oakton, Stangl's pond		200
Parker, Dorow's pond		100
South Dakota—Continued.		
Philips, Harding Grove Dam		125
Plankinton, James's lake		150
Saunders's lake		300
Redfield, Twin Lakes		300
Sisseton, Lake Traverse		400
Minnesota River		300
One Road Lake		300
Strand Creek		150
White Stone Lake		300
Wilcox Creek		150
Springfield, Emanuel Creek		300
Tabor, Rezac Lake		300
Tripp, Herr's lake		200
Van Metre, Inland Lake		125
Sun Flower Dam		125
Watertown, Lake Pelican		400
Tennessee:		
Austral, Childress Creek		150
Towey Creek		150
Chatanooga, Chickamauga Creek, East Branch		200
Chickamauga Creek, North Branch		200
Jetts Pond		200
Lookout Creek		200
Spring Creek		200
Cleveland, Candas Creek	2,400	
Greater Wildwood Lake		200
Hall's pond	800	
Wildwood Lake	2,400	
Clinton, Clinch River		200
Moore's pond	800	
Coal Creek, Coal Creek		200
Cool Creek	1,600	
Conasauga, Jack River		150
Curryhee, Little River, East Fork	2,065	
Knoxville, Little Pigeon River, East Fork	2,055	
Pigeon River, East Fork	2,055	
Loudon, Little Tennessee River		200
McGhee, Eagle Lake		150
Memphis, Toney Pool		105
Newcomb, Elk Fork Creek		200
Oakdale, Emory River		300
Tennga, Conasauga River		150
Townsend, Little River	3,425	
Texas:		
Albany, Honeycutt's pond		100
Roseland Lake		100
Alto, Bailey Pond		100
Alvarado, Rentfro's pond		100
Amarillo, Paladora Pond		900
Angus, Stewart's pond		400
Annona, Hill's pond		200
Kickapoo River		500
Arp, Hughes's pond		200
Athens, Shelton Mill Pond		400
Austin, Barton Creek		500
Avoca, Martin's pond		200
Axtell, Biggerstaff's pond		100
Bellevue, Ford Lake		400
Bennetts, Cat Tail Lake		150
Bettie, Sewell's pond		100
Bland Lake, Bland's pond		800
Blossom, Blossom Club Pond		150
Boerne, Cibolo Pond		150
Bowie, Black Pond		200
Waggoner Pond		100
Brady, Live Oak Creek		200
Brandon, Giles's lake		400
Bronson, Clear Lake		300
Travis Branch		950

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Texas—Continued.		
Brookesmith, Buena Vista Lake		100
Brownsville, Horseshoe Resaca Lake		1,000
Resaca de la Guerra Lake		1,000
Brownwood, Allison's pond		200
Camp's pond		150
Collins's pond		200
McGaugh Pond		200
Snyder's pond		1,000
Bryan, Nall's lake		150
Buckholtz, Helmcamp Pond		25
Calallen, Casa Morado Reservoir		160
Calvert, Calvert Country Club Lake		500
Canyon City, Canyon Lake		600
Paladora Creek		725
Pritchard's pond		600
Terra Blanco Creek		725
Carlos, Lake Carlos		800
Caro, Lower Saner Pond		150
Celina, English Lake		329
Moore's lake		300
Smith's lake		350
Stelzer's pool		125
Center, Wood Lake		300
Center Point, Medina River		1,500
Childress, Lake Keeler		1,150
Lake Scott		500
Clarendon, Allan Creek		300
Clarksville, Clarksville Country Club Lake		500
Cleburne, Cleburne Country Club Lake		200
Willow Pond		100
Clifton, Christenson's lake		112
Reeder's pond		112
Clyde, Deadman Pond		150
Colmesneil, Lively's lake		150
Colorado, McCreless's lake		200
Plasted's pond		600
Spring Creek Pond		300
White Elephant Lake		300
Cooledge, Cottonwood Lake		100
Long Branch Lake		200
McReynolds's reservoir		50
Valley Lake		201
Corsicana, Burks Lake		1,000
Morse's lake		200
Woodley Pond		500
Cotulla, Chapman Lake		400
Poteet Lake		400
Crowell, Burress's pond		300
Campbell's pond		150
Railroad Pond		400
Cuero, Hickory Lake		1,500
Cushing, Becton Lake		50
Dale, Eppright Pond		200
Dalhart, Rita Blanca Lake		200
Dallas, Bachman Pond		375
Coombs Creek		775
Tenison Lake		300
Decatur, Halsell Lake		100
DeKalb, Hathcocks's pond		300
Del Rio, Devils River		500
Denison, Lake Denison		800
Denton, Country Club Lake		300
Detroit, Clarksville Club Lake		400
Detroit Club Lake		150
Sample's pond		100
D'Hanis, Clay Hill Pond		300
Doucette, Pope's pond		400
Stewart's lake		200
Eagle Pass, Rosita Creek		1,000
Eastland, Kinnebrew Pool		300
Edgewood, Davis Pond		150
Elgin, Christian Lake		150
Egleston Lake		134

Disposition.	Fry.	Fingerlings.
Texas—Continued.		
Elgin, Keeble's lake		100
Elkhart, Elkhart Lake		2,000
Pate's pond		50
Encinal, Johnson Lake		500
Fluvanna, Little Bull Pond		300
Fort Worth, Concrete Pond		32
Davie Burns Lake		50
Happy Lake		300
Hush Lake		213
Lake View		300
Lake Wandry		213
Tandy's lake		200
Franklin, Cavitt's pond		200
Frisco, Stewarts Creek Lake		500
Gainesville, Gainesville Club Lake		600
Garrison, Brickyard Reservoir		100
Fishing Club Lake		500
Giddings, Braesel's pond		100
Carmean's pond		200
Dunk's pond		200
Gily Lake		50
Mitschkes Pond		100
Namkin's pond		100
Quarry Lake		150
Raube's pond		200
Schautschick's pond		100
Schkades Pond		150
Sumff's pond		100
Unger's pond		150
Wilson's pond		100
Gladwater, Phillips Spring Lake		150
Goldthwaite, Cain's pond		200
Gordon, Lake Creek		1,000
Goree, Goode's lake		300
Granbury, Lake Add-Ran		200
Robersou Creek		185
Grand Saline, Dunn Mill Pond		100
Grandview, Country Club Lake		1,200
Sturges's pond		150
Grapeland, Hodge's lakes		600
Keen Crystal Pond		500
Grapevine, Willey Lake		150
Yancy Lake		200
Greenbrier, Beckham Pond		400
Butler Pond		400
Country Club Lake		400
Indian Creek		400
Leek Creek		400
Mud Creek		400
South Side Lake		500
Hamlin, Country Club Lake		800
Harry Wynn Pond		200
Harlingen, Dilworth Lake		500
Harlingen Lake		500
Harrold, Ayers's pond		360
Haskell, Bevers's lake		300
Hico, Fairview Lake		150
Gilmore Creek		200
Higgins, First Creek		300
Poor Farm Lake		150
High Island, Smith's lake		1,000
Hillsboro, Park Lake		400
Hubbard, Jones's lake		100
Leftwich Lake		200
Jacksboro, Spring Pond		100
Sunny Brook Lake		100
Joaquin, Garrett's pond		150
Kaufman, Clark Lake		200
Pyle's lake		816
Sapp's pool		200
Taylor's pond		634
Willow Springs		200
Kemp, Berry Lake		300
Moorehead Lake		300
Porters Bluff Lake		400
Kingsville, Christenson's reservoir		100

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Texas—Continued.		
Kyle, Goforth Pond		150
Ladonia, Burton's pond		300
Elliott's pond		300
Water Works Pond		300
LaGrange, Crownover Lake		1,500
LaMarque, Irrigation Reservoir		1,500
Laredo, Bulls Eye Lake		500
Davis's pond		300
Moritas Lake		500
Perren's pond		400
Lillian, Ball's pond		150
Lillian Lake		150
Lindale, Roberts's pond		150
Llano Grande, Llano Grande Lake		1,000
Llano, Llano River		5,000
Shumake's pond		50
Longview, Harris's lake		400
Melton's lake		200
Taylor's pond		300
Lovelady, Patterson Lake		1,000
Lyford, Bamboo Lake		100
McGregor, Leon River		500
South Bosque Creek		400
Mabank, Caruthers's pond		200
Cockerell's pond		54
Grubb's pond		150
Hebel's pond		200
McCoy's pond		200
Pepper's pond		200
Robertson's pond		250
Wind Mill Pond		200
Madison, Donaho's pond		50
Mahl, Pleasant Hill Lake		75
Watkins's pond		50
Malakoff, Bartlett's pond		100
Brickyard Pond		200
Flagg's lake		400
Manchaca, Labenski Creek		400
Onion Creek		500
Marfa, Barker's pond		100
Marshall, Fern Lake		500
McClaran's lake		250
Maxwell, Schawe Lake		1,000
Memphis, Brice's lake		160
Cottonwood Creek		500
Jones Creek		400
Noel's lake		100
Parker Creek		500
Salt Creek		900
Spring Creek		500
Spring Lake		100
Mercedes, Davis Lake		1,000
Meridan, Johnson's lake		200
Merkel, Martin's lake		650
Miller's lake		400
Valley Farm Lake		300
Miles, Lipan Creek		410
Milford, Katy Pond		300
Mineola, Conger Pond		28
Lake Park Pond		100
Willow Pond		150
Mingus, Nine Lake		300
Thurber Lake		1,000
Mount Calm, Herring Lake		100
Mount Pleasant, Lake Dellwood		150
Mount Selman, Phialpha Lake		250
Mount Vernon, Devall's pond		150
Holbrook Lake		150
Nacogdoches, Fern Lake		1,000
Stone Lake		800
Navasota, Shell Lake		1,000
Yarboro Lake		1,000
New Braunfels, Comal Creek		600
Guadalupe River		300
Rebecca Creek		1,000
North Zulch, Railroad Reservoir		600
Texas—Continued.		
Oakwoods, Glaze Lake		800
Palestine, Huff Lake		900
Spring Park Lakes		600
Panhandle, West Dippon Creek		500
Paris, Bankhead Lake		400
Gordon Country Club Lake		1,000
Oak Grove Lake		150
Silver Lake		100
Pecos, Edward's pond		175
Pawkett's pond		150
Penelope, Sealy Pond		200
Pilot Point, Lake Feeley		100
Pittsburg, Adair Pond		100
City Lake		200
Davis Club Lake		150
Ferndale Lake		1,000
Flag Pond		300
Flannagan Pond		1,000
Hargrove Pond		150
Holt Pond		300
Hopkins's lake		30
Knights Mill Pond		1,000
Lilly Pond		200
Music Pond		200
Pilk Lake		200
Reves Lake		1,000
Reynolds Lake		1,000
Star Lake		200
Tittle Lake		300
Willow Lake		305
Plano, City Reservoir		1,000
Queen City, Griffin's pond		30
Randolph, Randolph Pool		300
Ranger, Water Works Lake		1,000
Ravenna, Eubanks's pond		150
Seals's pond		150
Ricardo, Bertelson's reservoir		100
Ringgold, Woolsey's pond		200
Rockdale, Clear Lake		300
Rogers, Rogers Lake		200
Rosebud, Ocker's pond		100
Williams Creek		400
Rotan, Cave Pond		150
Royston, Lake View		150
Saginaw, Canes Pond		200
Salesville, Herring's lake		800
San Angelo, Bismark Lake		500
Concho River		500
Cunningham Lake		500
Doorkey Lake		500
Gardners Lake		500
Mires Lake		500
North Concho River		500
Pecan Creek		500
Scines Lake		500
Spring Creek		500
Twin Mountains Lake		500
San Antonio, Anderson Club Pond		600
Billy Lake		900
Guinn's lake		60
Lake Toft		400
Sanger, Duck Creek		400
Hughes's pond		50
Sarber, Sarber Lake		500
Schulenburg, Running Spring		50
Seguin, Duck Lake		50
Sherman, O'Hanlon's pond		100
Stamford, Boulevard Pond		500
Park Pond		300
Swenson Pond		500
Tank Lake		300
University Park Lake		500
Wedington Pond		200
Sulphur Springs, Booker's pond		200
Byrd's pond		50

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Texas—Continued.		
Sulphur Springs, Higdon Pond		10
Pound Lake		10
Reiley Lake		20
Thompson Pond		20
Woodland Lake		150
Taylor, Taylor Lake		150
Temple, Lake Polk		300
Terrell, Arnolds Lake		100
Cooper Lake		200
Country Club Lake		900
Garrett's pond		100
Gordon Lake		500
Griffith League Lake		100
Landos Lake		400
Martin's lake		100
Oleander Lake		100
Sand Branch Lake		100
Walton Lake		100
White Rock Lake		150
Timpson, Green's lake		100
Wedgeworth's lake		300
Troup, Gourley Lake		200
Waco, Holloway Lake		300
Oak Lake		300
Turner's lake		100
Waller, Ellis Pond		400
Walnut Springs, Smitham's lake		50
Waxahachie, Bell Branch Lake		800
Bullard's lake		200
Davis's lake		200
Katy Fishing Club Lake		500
Spalding Lake		475
West End Lake		485
Weatherford, Briten Branch		50
Hammond Lake		2,300
Webbs, La Zeta Pond		400
Weinert, Edwards Lake		150
Lake Creek Tank		750
West, McClellan Lake		400
Wetmore, Classen's pond		50
Wichita Falls, Woodall's pond		300
Wills Point, McKinney Lake		100
Winsboro, Harris's pond		20
Wortham, Hardy Gin Lake		150
Yoakum, Mergenthal Pond		100
Shampaign's lake		200
Zulch, Zulch Lake		150
Utah:		
Centerville, Perkins' pond		100
Ogden, Brigham Pond		200
Virginia:		
Alleghany, Dunlap Creek		300
Ashland, Ashland Park Pond		75
King Pond		75
Atlee, Cross Creek Pond		100
Blackstone, Webb's pond		150
Bristol, Columbian Paper Co.'s reservoir		200
Broad Run, Broad Run		75
Brookneal, Falling Creek		250
Buffalo Junction, Aarons Creek	3,000	
Hites Pond		250
Pools Pond		250
Watkins Mill Pond	1,000	250
Callaghan, Dunlop Creek		400
Potts Creek		400
Chatham, Crystal Lake	1,000	
Hedrick's pond	1,000	
Church Road, Burnt Quarter Pond		200
Claremont, Snyder's pond		
Clarksville, Grassy Creek	2,000	
Island Creek	1,000	
Lewis's lake	2,000	

Disposition.	Fry.	Fingerlings.
Virginia—Continued.		
Clarkton, Staunton River Lake		500
Cobham, Cobham Park Pond		100
Cohoke, Cohoke Club Pond		75
Cologne, Bland's pond		75
Craigsville, Campbell Pond		75
Culpeper, Smith Run Pond		350
Danville, Dan River	1,000	
Drakes Branch, Twitty Creek		350
Drewryville, Drewry Mill Pond		250
Pope's pond		250
East Lexington, North River Pond		200
Elmont, Chickahominy Mill Pond		75
Evington, Haden Branch		200
Farmville, Bolling's pond		250
Richardson's pond		200
Fishers Hill, Shenandoah River		200
Fredericksburg, Corenty Pond		40
Rappahannock River		80
Gordonsville, Atkinson's pond		300
Harrisonburg, Dry River		100
Linville Creek Lake		100
North River		100
Hollins, Carvins Creek	2,000	
Hot Springs, Jackson River		400
Hunters, Little Hunting Creek		150
Heswick, Christan's pond		75
La Crosse, Meherrin River	3,000	
Lawrenceville, Great Creek		300
Meherrin River		300
Rose Creek		250
Lawyers, Leech's pond	1,000	
Leesburg, Goose Creek		50
Potomac River		200
Limeton, Shenandoah River, South Branch		300
Louisa, Kent Mill Pond		100
Lynchburg, Odd Fellows Home Lake		700
Martinsville, Smith River	3,000	
Moseley Junction, Oak Hill Pond		100
Mt. Jackson, Mill Creek		100
Shenandoah River		100
Shenandoah River, North Branch		100
Smith Creek		100
Natural Bridge, Buffalo Creek		250
Nelson, Aarons Creek		125
New Castle, Craig Creek	5,000	250
Johns Creek		250
Newport News, Jordan's lake		125
Norfolk, Lake Modoc		200
North River, North River		100
Nottaway, Robertson's pond		125
Oak Ridge, Oak Ridge Pond		500
Occoquan, Metzger's pond		40
Occoquan River		80
Wells Pond		40
Overall, Shenandoah River		300
Oyster Point, Oyster Point Pond		200
Youngs Mill Pond		200
Pamplin City, Bakers Mill Pond		250
Calhoun Pond		250
Rossers Mill Pond		250
Penola, Mataponi Pond		80
Petersburg, Brandon Pond		200
Cains Mill Pond		200
Daniels Pond		75
Kutchan Pond		75
Lake Ferndale Park		75
West End Park Lake		150
Rapidan, Taliaferro Lake		150

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Finger-lings.
Virginia—Continued.		
Richmond, Broad Lock Pond		1,000
Bryan Pond		1,000
Dead Creek Pond		1,000
Falling Creek		1,500
Flat Rock Pond		1,000
Fulton Club Pond		1,500
Garlick Pond		1,000
Lakeside Pond		100
Licking Creek Pond		1,000
MacGregor Hall Pond		1,000
Newman Pond		1,000
Powhite Pond		1,000
Providence Forge Pond		1,000
Reservoir Lake		100
Spring Pond		100
Rockfish, Hardwick Lake		75
Plainview Pond		100
Shawen's pond		100
Rocky Mound, Furnace Creek	1,000	
Big River	2,000	200
Roxbury, Etna Mill Pond		250
Rural Retreat, Scott's pond		2,000
Salem, Roanoke River		200
Saxe, Charlotte Pond		225
Shipman, Oak Ridge Pond		100
Soudan, Grass Creek	3,000	
South Boston, Butram Creek		200
Dan River		300
Strasburg, Shenandoah River		75
Shenandoah River, West Fork		75
Stuart, Mayo River		350
Swords Creek, Clinch River		200
Sycamore, Hunt Mill Pond		250
Tappahannock, Mornington Lake		200
Timber Ridge, North River		250
Urbanna, Jackson Mill Pond		200
Victoria, Abilene Reservoir	2,000	
Victoria Reservoir	2,000	
Village, Smithers Mill Pond		100
Virginia Beach, Lake Christine		300
Wadesville, Opequan Creek		200
Wakefield, Brittle's pond		100
Walkerford, James River		400
Walkers Station, Vaidens Mill Pond		400
Warren, Ballinger Creek		100
Waterlick, Shenandoah River		75
Weems, Carter Creek		200
Winchester, Back Creek		200
Hogue Creek		200
Woodstock, Shenandoah River, North Branch		100
Wytheville, Reed Creek	3,000	350
Washington:		
Anacortes, Lake Campbell		400
Paso Lake		300
Medical Lake, Clear Lake		400
Silver Lake		400
Montesano, Lake Neuwatzel		300
Newport, Casey Lake		250
Tacoma, Madrona Lake		200
West Virginia:		
Belva, Peters Creek		150
Bretz, Deckers Creek		4,000
Caddell, Cheat River		4,000
Capon Springs, Great Cacapon River		900
Chapmansville, Guyandotte River		240
Charleston, Elk River		200
Elm Grove, Big Wheeling Creek		400
Fairmont, Monongahela River		400
Tygarts Valley River		400
West Virginia—Continued.		
Felton, Tygarts Valley River		400
Glenalum, Tug River		150
Grafton, Tygarts Valley River		400
Harpers Ferry, Potomac River		1,150
Little Falls, Monongahela River		400
Morgantown, Deckers Creek		200
Monongahela River		640
Orleans Road, Potomac River		1,000
Paw Paw, Great Cacapon River		200
Philippi, Middle Fork River		400
Tygarts Valley River		400
Ripley, Mill Creek		80
Romney, Potomac River, South Branch		560
St. Albans, Coal River		400
Springfield, Potomac River, South Branch		300
Star City, Donkard Creek		400
Sutton, Elk River		1,400
Weston, Monongahela River, West Fork		600
Woodland, Fish Creek		400
Wisconsin:		
Albany, Sugar River		500
Butternut, Butternut Lake		600
Cable, Cable Lake		400
Henry Lake		150
Cisco, Palmer Lake		400
Cumberland, Beaver Dam Lake		400
Durand, Bear Lake		200
Plummer Lake		200
Thompson Lake		200
Elcho, Bass Lake		300
Enterprise Lake		500
Otter Lake		250
Elkhart, Crystal Lake		300
Elmwood, Eau Galle Mill Pond		300
Elroy, Mill Pond		250
Fairchild, Eau Claire River, North Fork		400
Fox Lake, Fox Lake		800
Genoa, Mississippi River		1,668
Gordon, Bass Lake		400
Blue Gill Lake		200
Hartford, Pike Lake		400
Hatfield, Lake Arbutus		600
Haugen, Bear Lake		600
Devils Lake		500
Hawkins, Shamrock Lake		250
Hayward, Grindstone Lake		300
Lake Court O'Reilles		400
Tripp's lake		200
Whitefish Lake		300
Hillsboro, Baraboo River, South Fork		250
Hurley, Island Lake		400
Independence, Bugle Lake		400
Trempealeau River		500
La Crosse, Mississippi River		4,666
Lake Beulah, Lake Beulah		1,200
Lake Geneva, Lake Como		1,000
Lavalle, Duren		200
Little Baraboo Pond		200
Long Lake, Fay Lake		400
Long Lake		400
Lublin, Lublin Lake		300
Medford, Lake Esadore		200
Lake Murat		200
Lake Perkins		400
Powell Lake		200
Richter Lake		200
Sacket Lake		200
Twin Lakes		200
Mellon, Beaver Lake		200
Carrot Lake		400
Herbert Lake		200

Details of Distribution of Fish and Fish Eggs—Continued.

LARGE-MOUTH BLACK BASS—Continued.

Disposition.	Fry.	Fingerlings.
Wisconsin—Continued.		
Mellon, Island Lake		400
Lake Caroline		400
Menomonie, Cub Lake		200
Lake Menomonie		400
Red Cedar		500
Stumps Slough		300
Youngs Lake		400
Merton, Lake Keesar		400
Muscoda, Mill Creek Pond		400
New Auburn, Jenstow Lake		200
Shatick Lake		250
Okauchee, Okauchee Lake		600
Pelican, Pelican Lake		800
Post Lake		500
Prairie du Chien, Mississippi River		4,250
Richfield, Lake Amy Belle		400
Sheboygan Falls, Sheboygan River		250
Wisconsin—Continued.		
Solon Springs, Twin Lakes		450
Sparta, La Crosse River		800
Perch Lake		300
State Line, Bass Lake		200
Black Oak Lake		400
Tomah, Water Mill Pond		300
Tomahawk Lake, Little Newman Lake		250
Turtle, Long Lake		400
Victory, Mississippi River		166
Wonewoc, Baraboo River		500
Baraboo River, North Branch		500
Wyoming:		
Basin, Red Canyon Reservoir		125
Shoshoni, Big Horn River		400
Total [a]	56,600	665,868

[a] Lost in transit, 25,135 fingerlings.

SUNFISH (BREAM).

Disposition.	Fingerlings, yearlings, and adults.
Alabama:	
Gordo, Hannah's pond	100
Haleyville, Haleyville Pond	125
Hodges, Strifel's pond	100
Kennedy, Savage's pond	100
Reform, Harper's pond	100
Sulligent, Maddox's pond	100
Tuscumbia, Tuscumbia Spring	100
Vance, Lawrence's pond	125
Arkansas:	
Greenwood, Saling's pond	150
Harrison, Bates's pond	150
Helena, Mississippi River	83,665
Hope, Brandon's pond	100
Johnson's pond	100
Little Rock, Asylum Pond	100
Mammoth Springs, Mammoth Springs	200
Marshall, Horton's pond	150
Nashville, Mine Creek	250
Reese's pond	100
Whelen, Edmond's pond	100
Connecticut:	
Leonard Bridge, Hop River	600
Seymour, Beecher's pond	300
Florida:	
Ehren, Floral Lake	100
Tampa, Saddle Bag Lake	100
Georgia:	
Adel, Beaver Dam Bay	50
Saddlebag Pond	50
Americus, Mountain Creek Pond	50
Ashburn, Clear Pond	50
Fitzgerald's pond	50
Atlanta, Moccasin Lake	110
Blue Ridge, Carter's pond	120
Chamblee, Jones's pond	25
Charing, Branch Pond	50
Clarkesville, Edward's pond	100
Hazel Creek	150
Clayton, Justus's pond	125
Collins, Jarriel's pond	50
Wilson's pond	50
Wrenn's pond	50
Georgia—Continued.	
Cuthbert, Nochaway Creek	100
Wade's pond	50
Ellaville, Murray's pond	100
Ellabelle, Tony Branch	200
Flint, Stegall's lake	400
Forsythe, Bessie Tift Lake	50
Jackson's pond	50
Garfield, Oglesby's pond	100
Glennville, De Loach's pond	50
Lewis's pond	50
Graymont, Cowert's pond	100
Wetherford's pond	100
Halcyondale, Simmons's pond	50
Junction City, Carlisle's pond	50
Moore's pond	50
Leesburg, Kinchatoonee Creek	100
Macon, Biarly Lodge Pond	150
Recreation Club Lake	100
Manchester, Manchester Pond	100
Marshallville, Grisolm Spring Pond	100
Outing Club Pond	100
Rumple's pond	100
Mayfield, Long's pond	200
Millen, Buckhead Creek	200
Ogeechee River	100
Munnerlyn, Rosemary Creek	100
Rupert, Bodiford's pond	50
Scarboro, Ogeechee River	100
Smithville, Kinchatoonee Creek	100
Muckalee Creek	100
Stillmore, Cannochee Pond	100
Stinson, Lake Benson	225
Summit, Bowie's pond	100
Brown's pond	100
Cowart's pond	50
Spring Branch Pond	50
Turner's pond	50
Sylvester, Pope's pond	50
Talbotton, Maxwell's pond	50
Parker's pond	50
Silver Lake	50
Wilson's pond	50

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNFISH (BREAM)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
Georgia—Continued.	
Tennille, Boatright's pond	100
The Rock, Stafford's pond	50
Tifton, Purdy's pond	50
Ty Ty, Parks's pond	50
Vienna, Lane's pond	50
Wade, Brinson's pond	50
Illinois:	
Belleville, Gauss's lake	200
Rheins's lake	100
Olney, Olney Reservoir	100
Indiana:	
Borden, Koerber's pond	100
Spring Pond	100
Bristol, Newman's pond	100
Carbon, Harrold's pond	300
Chrisney, Oak Hill Pond	100
Dubois, Silver Pond	100
Edinburg, Spring Lake	300
Fairmount, Little's pond	100
Manzanita Lake	100
Farmersburg, Lewis's pond	200
Kewanna, Bruce Lake	400
Lima, Still Lake	200
Madison, Big Creek	350
New Albany, Old Cave Pond	100
Ossian, Willow Pond	100
Silver Lake, Silver Lake	100
Veedersburg, Coal Creek	800
Iowa:	
Casey, Spring Lake	200
Cumberland, Hawthorn Lake	100
Fort Madison, Green Bay	1,100
Lime Springs, Upper Iowa River	4,500
North McGregor, Mississippi River	73,250
Underwood, Geise's pond	100
Kansas:	
Grenola, Cana River	200
Kentucky:	
Beard, Cypress Pond	100
Elizabethtown, Heady's pond	100
Eminence, Boyne's pond	100
Helbum's pond	100
Glasgow, Fallen Timber Creek	150
Grays, Lynn Camp Pond	400
Louisville, Lake Lansdowne	300
Saxton, Beech's pond	400
Sonora, Ireland's pond	150
Louisiana:	
Bogalusa, Bogalusa Pond	300
Homer, Gladney's pond	100
Spring Lake	100
Ruston, Pugh's pond	100
Scotland, Scotland Plantation Lake	200
Maryland:	
Bel Air, Barnes Run	150
Chevy Chase, Locust Lake	400
Landover, Oak Hill Pond	250
Mountain Lock, Potomac River	5,600
Massachusetts:	
Plymouth, King's pond	300
West Pond	300
Minnesota:	
Brownsville, Mississippi River	17,300
Smiley, Pelican Lake	500
Mississippi:	
Blue Mountain, Simmons' pond	100
Booneville, Gin Pond	100
Brookhaven, Applewhite's pond	100
Brooksville, Dixie Pond	100
Peterson's pond	150
Centreville, Dick's pond	150
Willow Lake	150
Collins, Mayfield's pond	125
Columbus, Fig Pond	300
Mississippi—Continued.	
Corinth, Pound's pond	100
Rilla Pond	100
Waukomis Lake	100
Crenshaw, Berk's pond	100
Mitchell's pond	100
Durant, McDonald's pond	100
Enterprise, Kamper's pond	100
Gandsi, Spring Pond	100
Hazelhurst, Harrison's pond	100
Heidelberg, Vernon's pond	100
Hickory, White Oak Pond	100
Houston, Knox's pond	100
Jackson, Spring Lake	100
Willow Pond	100
Laurel, Park Lake	150
Liberty, Ball's pond	100
Lockhart, Harbour's pond	100
McDonald, Ingram's pond	100
Macon, Boswell's pond	150
Eiland's pond	150
Howard's lake	125
Stuart's pond	100
Meridian, Bailey's pond	100
College Lake	100
Miller's pond	200
Suttle's pond	350
New Albany, Stroud's pond	100
Nicholson, Gentry's pond	100
Okolona, Colburn's pond	200
Quitman, Lake Ruth	100
McNair's pond	100
Sessums, Perkins' pond	100
Sherwood, Norris' pond	100
Shuqualak, Adams' lake	150
Wigwam Lake	150
Strongs, Lake Bolivar	100
Spring Creek	100
Williams' pond	100
Summit, Hillside Pond	200
Willow Pond	150
Taylorsville, Robinson's pond	100
Tishomingo, Holley's lake	150
Tupelo, Hill's pond	200
Van Vleet, Arnett Place Pond	250
Hickory Grove Pond	100
Waynesboro, Dyess Mill Pond	100
Oakland Pond	100
Patten's creek	100
Taylor's lake	100
Wilkins Mill Pond	100
West Point, Dunlap's lake	400
Ivy's pond	400
Trout Lake	100
Whittaker, Whittaker's pond	150
Yazoo City, Hicks' pond	100
Missouri:	
Arlington, Lukrofka's pond	400
Conway, Thomas' pond	200
Marquand, Clubb's pond	200
Nebraska:	
Cheney, Variety Grove Farm Pond	100
Nevada:	
Ely, Olsen's lake	150
New Mexico:	
Deming, Harris's pond	150
Elida, Mesa Lake	100
North Carolina:	
Aberdeen, Bonnie Brier Pond	75
Sand Hill Branch Pond	300
Angier, Matthews' pond	150
Concord, Clark Creek	225
Springville Pond	150
Fayetteville, Pine Lake	450
Franklinton, Dickerson Mill Pond	75

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNFISH (BREAM)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
North Carolina—Continued.	
Franklinton, Green Hill Pond	75
Spring Branch	75
Whiteside Pond	75
Williams's ponds	150
Gastonia, Crawford's pond	75
Lake Giles	225
Payes Lake	150
Spencer's lake	300
Glen Alpine, Silver Creek Pond	75
Gold Hill, Second Creek	150
Graham, Graham Country Club Pond	225
Guilford College, Ash Pond	75
Hendersonville, Lake Osceola	600
Lake West	300
Rhett's pond	150
High Point, Willard's pond	75
Landis, Codle Creek Pond	75
Landrum, Greenway's pond	75
Hughes' pond	150
Lexington, Bock's pond	175
Hargrave's pond	75
Liberty, Cane Creek Pond	75
Thompson's pond	75
Lilesville, Dockery's pond	225
Island Creek	225
Mill Brook, Pineridge Pond	210
Morgantown, McDowell's pond	100
Morven, Hamville Pond	75
Mill Pond	150
Spring Pond	150
Pinnacle, Culler's pond	75
Pittsboro, Four Springs Pond	225
Hailborne Pond	75
Petty's pond	150
Raleigh, Country Club Lake	300
Lynn's pond	75
Rockingham, Dog Branch Pond	75
Ronda, Bugaboo Pond	150
Little Elkin Pond	150
Rutherfordton, Broad River Pond	75
Salisbury, Cauble's pond	175
Glover's pond	125
Smithfield, Pou's pond	150
Southside, Rhyne's pond	75
Wake Forest, Allen's pond	75
Bobbitt's pond	100
Dickson's pond	100
Harrison's pond	100
Maltonia Club Pond	150
Moore's ponds	300
Spring Pond	100
Wilbon, Neill's pond	225
Wilkesboro, Roberson's pond	75
Winston-Salem, Holton's pond	75
Youngsville, Alexander's pond	75
North Dakota:	
Devils Lake, Devils Lake	1,000
Granville, Buffalo Lodge Lake	300
Oriska, Beyer's pond	70
St. John, Clear Lake	300
Hooker's lake	300
Lake Alexander	300
Lake Nemo	300
Waukipa Lake	300
Ohio:	
Ada, Hubbell's pond	100
Gallipolis, Safford's pond	100
Hebron, Buckeye Lake	600
Orbiston, Orbiston Pond	100
Perry, Shady Nook Pond	400
Rarden, Taylor's pond	100
Rossmoyne, Taylor's pond	100
Sharonville, Schatzle's pond	100
Tippecanoe City, Kessler's pond	100

Disposition.	Fingerlings, yearlings, and adults.
Oklahoma:	
Ardmore, City Lake	300
Dyer Lake	200
Reed's lake	100
Santa Fe Lake	300
Asher, Merrill's pond	100
Salt Creek Ponds	125
Doxey, Topper's pond	100
Elk City, Hughes's lake	100
Hugo, Wright's pond	100
Pryor, Miller's pond	100
Stuart, Coal Creek	100
Tyrone, Crites's pond	100
Pennsylvania:	
Canonsburg, Neill's pond	300
Danville, Susquehanna River	1,250
Hanover, Little Conewago Creek	150
Huntingdon, Raystown Branch	200
Icedale, Brandywine Creek	300
New Bethlehem, Leatherwood Creek	500
Palm, Hosenack Creek Lake	200
Perkiomen Creek	200
Reading, Maiden Creek	300
Tulpehocken Creek	300
Shoemakersville, Dreibelbis Creek	200
Moyer Creek	200
Temple, Ahren's pond	200
Bernhart's lake	200
Weissport, Big Creek	300
Windber, Ice Company Pond	200
York, Spring Lake	100
South Carolina:	
Aiken, Bridge Creek Pond	150
Johnson's pond	100
Shaw's pond	100
Thorpe's pond	100
Belton, Williams's pond	100
Bethune, Bell Branch Pond	100
Blacksburg, Parris's pond	75
Blaney, Crystal Lake	100
Borden, Pollard Mill Pond	100
Camden, Boykin's pond	100
McLeod's pond	200
Central, Arnold's pond	50
Holcomb's pond	50
Chester, Dry Fork Pond	75
Columbia, Cayce's pond	200
Gill Creek	200
Messer's pond	200
Mill Creek Pond	200
Poplar Branch Pond	100
Cope, Fogle's pond	100
Cordova, Smoak's pond	75
Fort Mill, Spring Pond	75
Gaffney, Parker's pond	75
Turner's pond	75
Graniteville, Power House Pond	75
Greenville, Houston's pond	150
Maple Creek Pond	75
Greenwood, Logan Branch	75
Moore Branch Pond	75
Spring Pond	75
Hartsville, Beaver Dam Pond	100
Prestwood Pond	100
Honea Path, Big Spring Pond	100
Broadmouth Creek	175
Kay's pond	150
Knight's pond	75
Little River	100
Johnston, Brimson's pond	100
Butler's pond	75
Calhoun's pond	75
Hilliard's pond	100
Hollingsworth's pond	75
Lott's pond	75

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNFISH (BREAM)—Continued.

Disposition.	Fingerlings, yearlings, and adults.
South Carolina—Continued.	
Johnston, Spring Branch	75
Ward Creek Pond	100
Kershaw, Horton's pond	75
Kinards, Oxner's pond	75
Lancaster, Steele's pond	75
Wildcat Pond	75
Laney, Robeson's pond	100
Langley, Little Horse Creek Pond	250
McCormick, Britt's pond	75
Spring House Pond	75
Spring Pond	100
Macedon, Bogy Pond	100
Newberry, Kings Creek	100
North Augusta, Big Branch Pond	100
North, White's pond	100
Orangeburg, Gue's pond	50
Pageland, Hicks's pond	100
Perry, Piney Branch Pond	125
Pickens, Colony Pond	50
Oolong Pond	75
Rock Hill, Mill Pond	100
Ruby, Oliver's pond	100
Salley, Branch Pond	150
Seneca, Langston's pond	50
Shoals Junction, Dunn's pond	100
Simpsonville, Rocky Creek Pond	75
Strother, McMahan's pond	50
Trenton, Hughes's pond	100
Horn Creek	75
Hunt Creek Pond	100
Marsh's pond	100
Raus's pond	75
Shaws Creek Pond	75
Webb's pond	75
Union, Buffalo Mill Pond	100
Municipal Reservoir	100
Wagner, Dean Swamp Pond	75
Walhalla, Bauknight's pond	75
Burley's pond	75
Oconee pond	75
Todd's pond	75
Verner's pond	75
Willington, Ariail's pond	75
Covin's pond	75
Gilbert's pond	75
Le Roy's pond	75
Little River	100
Winnsboro, Creight's pond	50
Haynes's pond	75
Woodruff, Chumley's pond	75
Ferguson Creek	50
Watson's pond	75
Yorkville, Smith's pond	75
South Dakota:	
Hitchcock, Cramer's pond	100
Scenic, Knutson's pond	425
Tennessee:	
Butler, Cable's pond	175
Concord, Turkey Creek Lake	200
Cookeville, Clause's pond	225
Cumberland Gap, Holly Hill Pond	200
Lambert's pond	200
Johnson City, Aspen Bower Lake	500
Knoxville, Little River	75
Maryville, Housholder's pond	200
Tate Springs, Kirkham's pond	75
Tate Springs Reservoir	150
Wautauga Point, Buffalo Creek	500
Whitesburg, Shields's pond	75
Texas:	
Amarillo, Famous Heights Park Lake	50
Big Springs, Davis's pond	35
Fisher's pond	35
Blum, Klondike Lake	100
Texas—Continued.	
Brady, Lime Oak Creek	75
Brazos, Blucher's pond	30
Carbon, Pierce's pond	30
Carthage, Hill's lakes	50
Cisco, Lake Borine	100
Clifton, Manske's pond	50
Comanche, Highland Lake	25
De Leon, Spring Pond	100
Elkhart, Elkhart Lake	200
Eskota, Kurth's pond	50
Fort Worth, Davie Burns Lake	50
Friona, Mayflower Pond	30
Gorman, King's pond	60
Lusk's pond	30
Gordon, Chenault's pond	50
Horlin's pond	30
Graham, Oak Grove Pond	20
Grand Saline, Brown's pond	30
Jacksonville, Belva Lake	200
Kaufman, Hoffer Pond	30
Kemp, Trinity Lake	100
Lindale, Mill Creek Pond	100
Llano, Doel's pond	40
Lytle, Carter's pond	30
Mabank, Grubb's pond	30
Manor, Johnson's reservoir	20
Marlin, Clark's pond	50
Marshall, Lake Ferns	300
Lake Katrine	50
Walker's lake	50
Merkel, Count's pond	30
Nacogdoches, Mamie Ross Lake	300
Rockdale, Coffield's pond	100
Randle's lake	40
Rotan, Hunter's pond	130
Saginaw, Beall's pond	50
Santo, Miller's pond	50
Terrell, McCord's pond	25
Renfro Creek Lake	25
Toyah, Humphries's pond	50
Tuxedo, Davis's lake	100
Tye, Worthington Lake	40
Tyler, Country Club Lake	200
Lake Park	200
Lake Wood	200
Walnut Springs, Smitham's lake	100
Wichita, Railroad Pond	60
Winnsboro, Baker's pond	20
Spring Lake	150
Virginia:	
Bealeton, Old Gum Spring Pond	150
Beaver Dam, Thompson's pond	125
Belmont Park, Goose Creek	350
Charlottesville, New Reservoir	225
Cumberland, Burleighhall Pond	125
Dillwyn, Fitzgerald's pond	125
Disputanta, Belsches's pond	125
Drewrys Bluff, Spring Lake	125
Duugamon, Kilgore's pond	450
East Lexington, North River Pond	400
Evington, Irvine's pond	200
Farmville, Agee's pond	250
Gladys, Maple Pond	200
Gordonsville, Oak Hill Pond	400
Orange, Mill Creek Pond	125
Pennington Gap, Hickory Flats Pond	200
Petersburg, Belscher's pond	400
Shipman, Mountain Pond	125
Spout Springs, Poplar Pond	150
Staunton, Gypsy Hill Lake	125
Troutville, Alderson's pond	150
Troy, Poplar Grove Pond	125
Winton, Brown's pond	200
Warrenton, Cedar Run	100

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNFISH (BREAM)—Continued.

Disposition.	Fingerlings, yearlings, and adults.	Disposition.	Fingerlings, yearlings, and adults.
Virginia—Continued.		Wisconsin—Continued.	
Warrenton, Forest Branch Pond	150	Independence, New City Pond	200
Washington:		La Crosse, Mississippi River	21,468
Oroville, Lemonosky Lake	300	Muscoda, Mill Creek Pond	300
West Virginia:		Prairie du Chien, Mississippi River	58,250
Bedington, Emerson's pond	500	Victory, Mississippi River	1,666
Weston, Walnut Fork Pond	200	Wyoming:	
Wisconsin:		Sheridan, Cut-Off Pond	150
Genoa, Mississippi River	4,166		
Independence, Bugle Lake	300	Total [a]	342,825

[a] Lost in transit, 2,810 fingerlings.

PIKE PERCH.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Arkansas:			
Des Arc, Caloutchie Bay		50,000	
Elkins, White River		400,000	
Helena, Mississippi River			800
Connecticut:			
Wallingford, Lake Quonnipaug		500,000	
Illinois:			
Havana, Illinois State Fish Commission	8,000,000		
Meredosia, Illinois River		930,000	
Momence, Kankakee River		1,260,000	
Wilmington, Kankakee River		1,260,000	
Indiana:			
Angola, Buck Lake		800,000	
Fox Lake		1,000,000	
Columbia City, Shriner Lake		1,200,000	
Leesburg, Shoe Lake		1,000,000	
Monticello, Tippecanoe River		1,500,000	
Rome City, Sylvan Lake		1,500,000	
Iowa:			
Clear Lake, Clear Lake		750,000	
Estherville, Des Moines River, West Branch		600,000	
Manchester, Maquoketa River		300,000	
Orleans, East Okeboji Lake		400,000	
Spirit Lake		400,000	
Ruthven, Lost Island Lake		400,000	
Waterloo, Cedar River		250,000	
West Liberty, Cedar River		200,000	
Kansas:			
Marion, Cottonwood River		400,000	
Kentucky:			
Hopkinsville, Waterworks Lake		800,000	
Lebanon, Beech Fork River		1,500,000	
Cartwright Creek		800,000	
Lloyds Creek		800,000	
North Fork Creek		1,000,000	
Pitman Creek		1,000,000	
Popes Creek		800,000	
Rolling Fork River		1,500,000	
South Fork Creek		1,000,000	
Massachusetts:			
Falmouth, Shivericks Pond		400,000	
Greenfield, Connecticut River		1,000,000	
Deerfield River		800,000	
Pittsfield, Pontosuc Lake		500,000	
Shelburne Falls, Deerfield River		600,000	
Waltham, Nonsuch Pond		500,000	
Michigan:			
Alpena, Long Lake		1,200,000	
Bay City, Saginaw Bay		4,500,000	
Birmingham, Wing Lake		500,000	
Crystal Falls, Mary Lake		540,000	
Detroit, Michigan Fish Commission	34,280,000		
Edwardsburg, Eagle Lake		975,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

PIKE PERCH—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Michigan—Continued.			
Hale Lake, Hale Lake		500,000	
Loon Lake		800,000	
Lincoln, Brownlee Lake		600,000	
Millersburg, Barnhart Lakes		800,000	
Paw Paw, Maple Lake		1,000,000	
St. Joseph, Lake Chapin		1,200,000	
Witch Lake, Horse Shoe Lake		360,000	
Minnesota:			
Alexandria, Lake Geneva		540,000	
Big Lake, Big Lake		500,000	
Brownsville, Mississippi River			1,730
Chub Lake, Chub Lake		400,000	
Hanging Horn Lake, Hanging Horn Lake		600,000	
Mankato, Lake Washington		720,000	
Missouri:			
Crocker, Gasconade River		400,000	
Roubidoux Creek		400,000	
St. Joseph, Missouri Fish Commission	2,000,000		
New Hampshire:			
Mountainview, Ossipee Lake		1,000,000	
Winchester, Forest Lake		500,000	
New Jersey:			
Boonton, Rockaway River		700,000	
New York:			
Addison, Canister River		600,000	
Bliss, Eagle Lake		600,000	
Lisle, Tioughnioga River		400,000	
North Dakota:			
Cando, State Fish Commission	10,000,000		
Ohio:			
Columbus, Scioto River		1,000,000	
Fremont, Sandusky River		1,000,000	
Holliers Beach, Lake Erie		16,000,000	
Isle St. George, Lake Erie		16,000,000	
Lima, Lima Lake		1,000,000	
Port Clinton, Lake Erie		475,000	
Put-in Bay, Lake Erie		20,000,000	
Ohio State Commission	170,725,000		
Toledo, Lake Erie		10,000,000	
Upper Sandusky, Upper Sandusky River		1,500,000	
Oklahoma:			
Tahlequah, Illinois River		400,000	
Pennsylvania:			
Bushkill, Delaware River		800,000	
Coolbaugh, Echo Lake		600,000	
Erie, Pennsylvania Fish Commission	96,450,000		
Factoryville, Lake Kewanna		700,000	
Goldsboro, Susquehanna River		500,000	
Huntingdon, Raystown Branch		700,000	
New Freedom, Clipper Dam		300,000	
New Milford, Upper Lake		700,000	
Spruce Hill, Tuscarora Creek		500,000	
Susquehanna, Page Pond		800,000	
Susquehanna River		800,000	
Vicksburg, Armstrong Run		200,000	
Wilkes-Barre, Nuangola Lake		1,000,000	
Wrightsville, Susquehanna River		500,000	
York Haven, Susquehanna River		500,000	
South Dakota:			
Langford, Ninemile Lake		800,000	
Sixmile Lake		800,000	
Tennessee:			
Springfield, Milldale Pond		800,000	
Vermont:			
Boltonville, Tickle Necked Pond		600,000	
Ludlow, Plymouth Pond		800,000	
Miles Pond, Miles Pond		800,000	
Swanton, Lake Champlain		11,000,000	
West Danville, Joe's pond		1,000,000	
Virginia:			
Wytheville, Reed Creek		1,000,000	
West Virginia:			
Fairmont, Tygarts Valley River		500,000	
Morgantown, Cheat River		800,000	
Wisconsin:			
Antigo, Edith Lake		400,000	
Barronette, Deep Lake		500,000	

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

PIKE PERCH—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Wisconsin—Continued.			
Cable, Namekagon Lake		800,000	
Colgate, Lake Five		500,000	
Crandon, Oak Lake		800,000	
Genoa, Mississippi River			416
Gordon, Bass Lake		400,000	
Clear Lake		400,000	
Wagner Lake		400,000	
Greenwood, Popple River		600,000	
Hancock, Fish Lake		400,000	
Haugen, Pokagama Lake		500,000	
Iron River, Lower Pike Lake		720,000	
Kewaunee Kewaunee River		450,000	
La Crosse, Mississippi River			2,148
Nashville, Dry Lake		600,000	
Okauchee, Okauchee Lake		2,500,000	
Stone Lake, Whitefish Lake		400,000	
Victory, Mississippi River			166
Wonewoc, Baraboo River		800,000	
Total[a]	321,455,000	154,480,000	5,260

YELLOW PERCH.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Colorado:			
La Jara, Laguna Escondida			200
Connecticut:			
Hadlyme, State Fish Commission	5,200,000		
Delaware:			
Wilmington, Brandywine Creek		800,000	
Illinois:			
Carbondale, Horse Shoe Lake			200
Chicago, Armour's pond			900
Otis's pond			900
Eckerts, Deich's pond			100
Irving, Funk's lake			500
Millstadt, Grossman's pond			300
Shipman, Olmsted's pond			400
Indiana:			
Angola, Walled Lake			200
Centerville, Kitterman's pond			90
Edinburg, White River, East Fork			200
Lake Cicott, Lake Cicott			300
Lebanon, Saltmarsh Pond			75
Silver Lake, Silver Lake			200
Winchester, Summers's pond			100
Iowa:			
Lime Springs, Upper Iowa River			20
McGregor, Lake Como			900
North McGregor, Mississippi River			42,750
Kansas:			
Pittsburg, Gibson Pond			100
Kentucky:			
Cropper, Dunavent's pond			100
Pollard's pond			100
Louisville, Lake Lansdowne			300
Park View Lake			100
Woodbine, Lake Placid			300
Maryland:			
Accokeek Creek, Potomac River		66,117,500	
Baltimore, Patapsco River Pond			150
Bryans Point, Potomac River		10,945,000	
Bush River, Bush River		2,400,000	
Cecil, Chesapeake Bay		23,600,000	
Chase, Dundee River		600,000	
Freeland, South Lake			300
Gunpowder, Gunpowder River		2,200,000	
Harford, Swan Creek		9,500,000	
Harmony Grove, Richfield Pond		200,000	
Havre de Grace, Chesapeake Bay		12,600,000	
Pamunkey Creek, Potomac River		10,985,000	
Piscataway Creek, Potomac River		64,887,500	
Principio, Chesapeake Bay		15,000,000	

[a] Lost in transit, 545,000 fry.

Details of Distribution of Fish and Fish Eggs—Continued.

YELLOW PERCH—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Maryland—Continued.			
Swan Creek, Potomac River		5,915,000	
Town Point, Elk River		41,000,000	
Waterbury, Old Place Creek		400,000	
Massachusetts:			
Merrimac, Sargent's pond		400,000	
Michigan:			
Alpena, Lake Esau			400
Minnesota:			
Brownsville, Mississippi River			4,000
Rochester, Zumbro Mill Pond			200
Missouri:			
St. Charles, Crystal Lake			100
New Hampshire:			
Meredith, Long Pond		400,000	
New Jersey:			
Hammonton, Hammonton Lake		800,000	
Netcong, Bear Pond			200
Pompton Lakes, Pompton Lakes		1,000,000	
Pompton River		1,000,000	
Red Bank, Shrewsbury Pond		200,000	
New Mexico:			
Colfax, Adams Lake			219
New York:			
Auburn, Owasco Lake			2,000
Fallsburg, Ruddick Pond		600,000	
Flushing, Iron Spring Lake			150
Middleton, Ketchens Pond		600,000	
Summit Lake		400,000	
Millers Place, Hopkins Pond		200,000	
Mohonk Lake, Mohonk Reservoir		200,000	
Monroe, Monebasha Lake		600,000	
Round Island Lake		600,000	
Walton Lake		600,000	
North Carolina:			
Hendersonville, Tulip Pond			60
Lexington, Hankins' pond			100
Nokomis Mill Pond			100
Sandy Creek Pond			100
Salisbury, Cooleemee Pond			100
Miller's pond			100
Second Creek			100
Statesville, Buffalo Shoal Pond			100
North Dakota:			
Devils Lake, Devils Lake			1,000
Lisbon, Mulinex's pond			200
Milnor, Star Pond			175
Ohio:			
Marion, Scioto River			70
Oklahoma:			
Devol, Suter's pond			70
El Reno, Carter's pond			75
McAlester, Cole's lake			50
Marietta, Love's lake			100
Ochelata, Upper Pond			150
Oklahoma City, Lake View Lake			250
Pennsylvania:			
Bedford, Dunning Creek			120
Raystown Branch			120
Bunkney, Susquehanna River		600,000	
Danville, Susquehanna River			425
Devon, Eldonridge Pond		200,000	
Dushore, Headley Pond		600,000	
Housingers Pond		400,000	
Mill Pond			125
Factoryville, Gardners Pond		600,000	
Freeport, Briar Patch Pond			100
Greenville, Shenango River			325
Honey Brook, Mackelduff Pond		400,000	
Indiana, Crooked Creek			150
Ledys, Big Pond			150
Lenape, Brandywine River		1,000,000	
New Freedom, Smith Ponds			300
Sheridan, Tulpehocken Creek		600,000	
Waltersburg, Big Redstone Pond			100
South Carolina:			
Calhoun, Twenty-three Mile Creek			120
Denmark, Savannah Lake			180

Details of Distribution of Fish and Fish Eggs—Continued.

YELLOW PERCH—Continued.

Disposition.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
South Carolina—Continued.			
Gaffney, Sarratt's pond			60
Greenville, Greenville Lake			120
Trenton, Horse Creek Pond			60
Troy, Spring Branch			60
South Dakota:			
Madison, Lake Herman			600
Vermont:			
Brattleboro, West River		300,000	
Lyndonville, Chandler Pond		600,000	
Bean Pond		400,000	
Poultney, Lake St. Catherine		500,000	
St. Johnsbury, Passumpsic River			1,445
Walden, Coles Pond		800,000	
Virginia:			
Boyce, Shenandoah River		2,000,000	
Charlottesville, Maury's pond			125
Danville, Maple Grove Pond			200
Dinwiddie, Cat Tail Pond		300,000	
Dogue Creek, Potomac River		26,680,000	
Little Hunting Creek, Potomac River		4,550,000	
Pohick Creek, Potomac River		10,205,000	
Rockfish, Hardwick Lake		400,000	
Rockfish Lake			250
Scottsville, Spring Pond			100
Washington:			
Tacoma, American and Gravelly Lakes			500
West Virginia:			
Milton, Newman Springs			100
Rippon, Bull Shin Creek		1,000,000	
Wisconsin:			
Elkhart, Elkhart Lake			300
La Crosse, Mississippi River			4,000
Lake Mills, Rock Lake			600
Prairie du Chien, Mississippi River			37,750
Total [a]	5,200,000	326,885,000	108,439

[a] Lost in transit, 856 fingerlings.

STRIPED BASS.

Disposition.	Eggs.	Fry.
Maryland:		
Havre de Grace, Chesapeake Bay		115,000
North Carolina:		
Weldon, Roanoke River	4,566,000	2,669,000
Total	4,566,000	2,784,000

WHITE BASS.

Disposition.	Fingerlings, yearlings, and adults.
Arkansas:	
Helena, Mississippi River	5,950
Wisconsin:	
Genoa, Mississippi River	34
LaCrosse, Mississippi River	33
Victory, Mississippi River	33
Total	6,050

Details of Distribution of Fish and Fish Eggs—Continued.

WHITE PERCH.

Disposition.	Eggs.	Fry.
Connecticut:		
Seymour, Hemp Swamp Pond		400,000
Delaware:		
Nassau, Red Mill Pond		2,400,000
Wilmington, Brandywine Creek		800,000
Maryland:		
Bush River Station, Bush River		2,000,000
Chase, Dundee Creek		4,000,000
Havre de Grace, Chesapeake Bay		122,450,000
Elk River		18,250,000
Susquehanna River		66,800,000
Hendersons Point, Elk River		32,555,000
Locust Point, Chesapeake Bay		5,150,000
Swan Creek, Chesapeake Bay		17,100,000
Town Point, Elk River		37,750,000
Wild Duck Harbor, Susquehanna River		20,825,000
Massachusetts:		
Gardner, Stoddard Meadow Pond		400,000
Tilton Pond		400,000
Whitman Pond		400,000
Leominster, Spectacle Pond		800,000
South Sudbury, Bright's pond		400,000
New Hampshire:		
Baboosic, Baboosic Lake		800,000
Raymond, Pawtuckaway Lake		400,000
Winchester, Forest Lake		600,000
New Jersey:		
Boonton, Dixson Pond		600,000
New York:		
Albany, Forest, Fish and Game Commission	15,000,000	
Lake Waccabuc, Waccabuc Lake		800,000
Lewisboro, Trinity Lake		600,000
Middletown, Hennessey Lake		600,000
New York, New York Aquarium	1,500,000	
Pennsylvania:		
Annville, Quittapahilla Creek		400,000
Vermont:		
Montpelier, Groton Lake		800,000
Total	16,500,000	338,480,000

YELLOW BASS.

Disposition.	Fingerlings, yearlings, and adults.
Arkansas:	
Helena, Mississippi River	250

SEA BASS.

Disposition.	Fry.
Massachusetts:	
Falmouth, Buzzards Bay	253,000
Quissett Harbor	555,000
Total	808,000

MACKEREL.

Massachusetts:	
Falmouth, Buzzards Bay	388,000
Great Harbor	338,000
Gosnold, Vineyard Sound	38,000
Total	764,000

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

FRESHWATER DRUM.

Disposition.	Fingerlings, yearlings, and adults.
Arkansas:	
Helena, Mississippi River	8,950
Iowa:	
North McGregor, Mississippi River	1,500
Wisconsin:	
Prairie du Chien, Mississippi River	1,500
Total	11,950

COD.

Disposition.	Eggs.	Fry.
Maine:		
Boothbay Harbor, Boothbay Harbor		6,310,000
Kinekins Bay		4,304,000
Cape Elizabeth, Casco Bay		4,274,000
Massachusetts:		
Beverly, Massachusetts Bay		38,658,000
Falmouth, Buzzards Bay		9,733,000
Gloucester, Atlantic Ocean	9,854,000	22,510,000
Ipswich Bay		29,060,000
Massachusetts Bay		9,305,000
Gosnold, Buzzards Bay		5,979,000
Vineyard Sound		44,423,000
Great Harbor, Vineyard Sound		163,000
Manchester, Massachusetts Bay		4,630,000
Marblehead, Massachusetts Bay		2,580,000
Provincetown, Provincetown Harbor		862,000
Rockport, Atlantic Ocean		18,250,000
Ipswich Bay		9,060,000
Woods Hole, Eel Pond		253,000
Total	9,854,000	210,354,000

HADDOCK.

Disposition.	Fry.
Maine:	
Boothbay Harbor, Boothbay Harbor	712,000

POLLOCK.

Disposition.	Fry.	Disposition.	Fry.
Massachusetts:		Massachusetts—Continued.	
Beverly, Massachusetts Bay	1,330,000	Manchester, Massachusetts Bay	14,510,000
Gloucester, Atlantic Ocean	12,400,000	Rockport, Atlantic Ocean	5,800,000
Ipswich Bay	1,180,000		
Massachusetts Bay	2,920,000	Total	38,140,000

Details of Distribution of Fish and Fish Eggs—Continued.

FLATFISH.

Disposition.	Fry.
Maine:	
Boothbay Harbor, Boothbay Harbor	380,176,000
Linekin Bay	4,591,000
Mill Cove	17,398,000
Massachusetts:	
Beverly, Massachusetts Bay	18,210,000
Falmouth, Buzzards Bay	11,156,000
Great Harbor	6,138,000
Little Harbor	2,047,000
Quissett Harbor	6,579,000
Gloucester, Annisquam River	111,170,000
Gloucester Harbor	109,540,000
Ipswich Bay	7,800,000
Gosnold, Buzzards Bay	21,783,000
Hadley Harbor	17,264,000
Lackey Bay	12,328,000
Robinson Hole	7,063,000
Tarpaulin Cove	17,006,000
Vineyard Sound	18,810,000
Massachusetts—Continued.	
Manchester, Massachusetts Bay	61,020,000
Monument Beach, Monument Beach Harbor	5,751,000
Provincetown, Provincetown Harbor	4,678,000
Quissett, Quissett Harbor	7,797,000
Rockport, Rockport Harbor	5,080,000
Waquoit, Waquoit Bay	23,655,000
Wareham, Wareham River	4,142,000
Woods Hole, Great Harbor	11,661,000
Woods Hole Harbor	6,090,000
Rhode Island:	
East Greenwich, East Greenwich Bay	12,134,000
Newport, Narragansett Bay	13,254,000
Wickford, Wickford Harbor	6,434,000
Total	930,755,000

LOBSTERS.

Disposition.	Fry.
Maine:	
Biddeford Pool, Biddeford Pool Harbor	10,000,000
Wood Isle Harbor	2,000,000
Boothbay Harbor, Boothbay Harbor	6,000,000
Bristol, Johns Bay	3,000,000
Brooklin, Naskeg Harbor	250,000
Camden, Camden Harbor	1,000,000
Cape Porpoise, Cape Porpoise Harbor	4,500,000
Damariscotta, Damariscotta River	500,000
Deer Isle, Eggemoggin Reach	500,000
Southwest Harbor	400,000
East Boothbay, Linekin Bay	1,000,000
Eastport, Broad Cove	5,250,000
Falmouth, Casco Bay	4,000,000
Frenchboro, Frenchboro Harbor	500,000
Long Isle Harbor	1,500,000
Friendship, Friendship Harbor	3,500,000
Isleboro, Penobscot Bay	400,000
Isleford, Isleford Harbor	1,500,000
Isle of Shoals, Gulf of Maine	1,600,000
Isle of Shoals Harbor	1,000,000
Piscataqua River	400,000
Jonesport, Roque Isle Harbor	650,000
Kennebunk, Kennebunk Port Harbor	500,000
Wells Bay	500,000
Kittery Point, Pepperals Cove	1,500,000
Little Deer Isle, Billings Cove	200,000
Lowry, Delanos Cove	3,000,000
Milbridge, Pigeon Hill Bay	2,000,000
Mount Desert, Bass Harbor	1,000,000
Southwest Harbor	500,000
New Harbor, New Harbor	3,500,000
North Haven, North Haven Harbor	1,500,000
Pulpit Harbor	1,000,000
Orrs Island, Lowells Cove	500,000
Pemaquid, Pemaquid Harbor	3,500,000
Port Clyde, Port Clyde Harbor	1,000,000
Portland, Casco Bay	5,000,000
Peaks Isle Roads	3,500,000
Portland Harbor	2,500,000
Prospect Harbor, Bunkers Harbor	3,000,000
Dyers Bay	12,000,000
Rockland, Rockland Harbor	3,000,000
Rockport, Rockport Harbor	1,000,000
Small Point, Horse Isle Harbor	500,000
Small Point Harbor	2,106,000
Maine—Continued.	
South Addison, Pleasant Bay	250,000
South Hancock, Skillings River	2,000,000
Southport, Atlantic Ocean	4,500,000
Cape Harbor	1,500,000
Deckers Cove	1,500,000
Ebencook Harbor	500,000
St. George, Martins Harbor	1,000,000
Stonington, Stonington Harbor	500,000
Surry, Union Bay	250,000
Swan Isle, Old Harbor	500,000
Tennants Harbor, Owls Head Bay	1,000,000
Vinal Haven, Vinal Haven Harbor	3,000,000
Wells, Wells Bay	500,000
West Lubec, Grand Manan Channel	350,000
Winneganee, New Meadows River	1,500,000
Winter Harbor, Winter Harbor	500,000
York, York Harbor	4,500,000
Massachusetts:	
Bakers Island, Massachusetts Bay	300,000
Beverly, Massachusetts Bay	1,400,000
Boston, Boston Bay	3,700,000
Cohassett, Massachusetts Bay	834,000
Falmouth, Buzzards Bay	493,000
Quissett Harbor	874,000
Vineyard Sound	341,000
Gloucester, Atlantic Ocean	2,800,000
Gloucester Harbor	600,000
Ipswich Bay	500,000
Gosnold, Buzzards Bay	2,721,000
Cuttyhunk Harbor	1,087,000
Hadley Harbor	827,000
Lackeys Bay	2,868,000
Vineyard Sound	6,165,000
Lanesville, Ipswich Bay	1,100,000
Manchester, Massachusetts Bay	2,860,000
Marblehead, Boston Bay	300,000
Rockport, Atlantic Ocean	600,000
Rockport Harbor	600,000
Swampscott Harbor, Massachusetts Bay	200,000
Woods Hole, Coles Pond	192,000
Great Harbor	1,097,000
New Hampshire:	
Stratford, Little New Harbor	4,000,000
Oregon:	
Yaquina, Yaquina Bay	[a] 1,532
Total	162,505,000

[a] Adults, of which 520 were lost in transit.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES STEAMER ALBATROSS DURING THE PHILIPPINE EXPEDITION, 1907–1910

Bureau of Fisheries Document No. 741

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES STEAMER ALBATROSS DURING THE PHILIPPINE EXPEDITION, 1907–1910.

The Philippine cruise of the *Albatross* covered a greater period of time than any single expedition previously undertaken by that vessel. The ship left San Francisco October 16, 1907, and, sailing by way of the Hawaiian Islands, Midway, and Guam, arrived at Manila November 28. The stop at Midway, occasioned by a requisition of the vessel to carry stores from Honolulu to the United States marines stationed on Midway, was made the opportunity to take a small collection of the reef fishes and shore fauna of that group of islands. The number of fishes was very small, owing to the inability to carry enough explosive to do effective work, only 10 pounds of dynamite being allowed for use here and at Guam. Small collections were similarly made at this latter place when the ship stopped there for coal.

A two months' delay in the arrival of the stores which had been shipped from New York direct to Manila limited the vessel's activity for that period to the immediate vicinity of Manila. Thereafter the work was done by a series of short cruises made to the different parts of the Archipelago with Manila as a base for supplies and the deposit of collections.

During the period between February 2 and June 9, 1908, cruises were made to the southward, the first along the southwest side of Mindanao, thence through the Sulu groups, extending as far as Sandakan, Borneo; the second through the central group, including Panay, Negros, Cebu, Leyte, Masbate, and Marinduque; the third about the east and southeast coasts of Mindanao.

After the return to Manila from the last of these cruises it had become apparent that the *Albatross* required extensive repairs, and in August the ship left for Hongkong to have these made. Upon conclusion of this work in October Pratas Reef was visited and a number of soundings and trawl hauls were later made in the China Sea between that reef and the Batan Islands. Some work was done in the Batan and Babuyan islands and on the northern end of Luzon. Contemplated stops along the northwesterly coast of Luzon were prevented by bad weather which culminated in a typhoon.

During December, 1908, and January, 1909, a cruise through the Calamianes and the western and southern regions of Palawan was completed, touching on the return trip at Sandakan, Cagayan Sulu, and Iloilo. Late in January and early in February a number of cod trawl sets were made in the vicinity of Mariveles, but with indifferent success. The succeeding month was spent along the southern coasts of Luzon and adjacent islands, continuing thence southerly along the small islands to Bohol, thence westerly by the Cagayanes to the east coast of Palawan and northward into the Cuyos, returning to Manila early in April.

After a short trip to Lingayen Gulf early in May, the ship cruised along the small islands north of Samar and on the southeast coast of Luzon as far as Maculabo Island above San Miguel Bay, returning to Manila late in June. The latter part of July and all of August and September were spent in cruising from the southern coast of Samar, along southeastern Leyte, thence along the northern coast of Mindanao as far as Dapitan, thence northerly to Cebu, where some time was lost in repairing the boilers. The latter part of the period was consumed in further work in the vicinity of Zamboanga and along the Sulu group as far as Borneo, touching at a few small islands adjacent to the Borneo coast. Early in November the ship undertook a supplementary trip through the Dutch East Indies, touching at Menado, Ternate, Amboina, and Macassar, as well as at many intermediate points. On this trip a number of trawl hauls were made, including some exploration of the waters of the gulfs of Tomini and Boni in Celebes.

The homeward trip from Manila was begun January 21, 1910. Bad weather and other difficulties prevented the execution of orders to continue the work in the vicinity of Formosa and the Loo Choo Islands; at only two stops in Formosa were any collections made. After further repairs to the vessel in Japan, sail was set for the United States and San Francisco was reached May 4, 1910, after an absence of over two and one-half years.

EXPLANATION OF TABLES.

The last previous dredging station of the *Albatross* was no. 5095, the last hydrographic station was no. 4896, occupied during the northwestern Pacific cruise of 1906. (See Bureau of Fisheries Document 621.) Five hundred and seventy-seven dredging and 41 hydrographic stations were occupied during the Philippine expedition, extending the series of dredging stations to no. 5622 and the hydrographic series to no. 4937. In the tables the series are distinguished by the prefixed letters D and H, respectively.

Only those stations where the ship's gear was used (i. e., with the ship as an instrument) to collect natural-history specimens have been designated in the records as dredging stations. At times specimens were taken with dip nets during the occupation of a hydrographic station, but on account of the irregularity of such collecting the station was not regarded as a collecting station. No numbers have been given to the numerous shore stations, nor to minor collections made with the ship at anchor. But numbers have been given in the dredging series to hauls of the large intermediate net when used in a tideway with the ship at anchor.

Since the shore work constitutes such an important part of the total, the data regarding shore stations is shown in chronological order with the dredging stations, the locality, apparatus, etc., appearing in the appropriate columns. To economize time most of the reef collections of fishes were made with dynamite. The method was to locate the desirable fishes in the coral growth by means of a view glass (a glass-bottomed box) used from a boat. A small charge of dynamite with electrical connections was carefully lowered and discharged. Such fishes as floated were at once collected with a dip net, and the place marked by a buoy. As soon as the bottom had cleared it was searched and the dead fish gathered by diving or more usually by means of long-handled spears.

The various kinds of apparatus used at each station are recorded in the tables in chronological order, each on a separate line, opposite the station number, or, in case of unnumbered stations, opposite the locality, in the column "Apparatus."

The "Position" of a station is that point occupied by the vessel, as determined by the navigator at the time of beginning the first operation at that station. The position of the subsequent operations under the same station number corresponds in a general way to the line as indicated under "Drift." The distance covered by all the operations of a station is usually, however, not greater than the negligible error of observation, except in stations near shore determined by bearings.

In relation to the hydrographic information obtained, the degree of accuracy with which positions are located is of greater importance, and a description of the methods is necessary to the proper use of this information. A great part of the region traversed is still unsurveyed; and even where surveyed, parts are incorrectly or incompletely charted. Owing to press of work and lack of time, no opportunity was afforded to correct such errors, and the best available charts were therefore used as the basis of all determinations of position when in sight of land; in the column "Chart" is noted the number and edition of the chart used at each station.

59395°—11——11

When in sight of land position was fixed by compass bearings, and from the position so obtained *on the chart in use* the latitude and longitude were pricked off and set down in the record as the position of the station. If these charts should hereafter be corrected in latitude and longitude, the positions assigned to the stations must be changed accordingly.

In conformity with previous practice, an additional position, by true bearing and distance, of some prominent shore feature is given for each station when practicable. As viewed from the ship, the nearest and most prominent objects on shore from which the ship's position was determined were often topographical features, inconspicuous and unnamed on the chart, and impossible of identification by a brief written description. Therefore the bearings given in the tables were laid off from the plotted position on the chart to some object prominent on the chart, whether the object could actually be seen from the ship or not; though whenever convenient one of the two points taken for bearings by the navigator in determining the position is used in the table as the point of reference. The letters (S.), (N.), (W.), or (E.) indicate, respectively, the south, north, west, or east tangent of the point of reference after which they are placed; e. g., Verde Id. (E.)=eastern tangent of Verde Island.

All bearings are true unless otherwise indicated.

The spelling of all geographic names in these tables is that found on the charts designated in the column "Chart." There is considerable variation in this respect in the different issues of charts.

"Time of day" in the case of soundings indicates the time the plummet struck bottom; in the case of dredgings, the time at which the apparatus began to tow on the bottom; in the case of intermediate nets, the time at which the nets started to tow at the depth indicated; in the case of surface hauls, the time at which they were lowered into the water and began to be towed or the current to pass through them.

"Depth" (in fathoms) is the depth obtained by the sounding when a sounding was made. In cases where no sounding was made the depth is estimated from the chart, unless the station immediately follows another, in which case the depth obtained at the preceding station is given. In seine hauls the depths given are approximate, and represent the greatest depth of water through which the seine was hauled.

"Temperatures." The air temperatures are taken from the ship's log for the hour nearest the hour entered in the time column; the same is true of the surface temperatures where the towing commenced near the hour mark, but in other cases the surface temperature was

taken at the time given. The bottom temperature was taken at the time of sounding. All readings by Fahrenheit thermometer.

"Density." The water density is in all cases reduced to 15° C. The density of bottom water was ascertained from a sample taken by the Sigsbee water bottle. Inability to secure an accurate working of this instrument led to the discontinuance of the trials.

In the double column "Trial" is indicated the depth at which apparatus was worked, as well as the duration of operation. In the case of bottom apparatus this latter is the time during which it is supposed to be dragging on the bottom, up to the beginning of reeling in; for intermediate nets the time occupied in towing at the depth shown in the depth column is indicated by the first quantity, the time occupied in hoisting by the second; for surface nets the time indicated is the time actually towed at the surface.

In the double column of "Drift" is shown approximately the general direction in which the gear was hauled as well as the distance. The state of the currents and of the wind, with the exigencies incident to the steering of the ship, make this more or less inaccurate.

The apparatus used consisted of the usual beam trawls for all work on the bottom. All intermediate and surface work was done with a large tow net and small plankton or Kofoid nets, except an unsuccessful trial of a triangular shear-board net.

Abbreviations and Symbols.

12′ Ag...........12-foot Agassiz beam trawl. The Agassiz type of beam trawl was used more and with better results than any other used during the cruise. The runners now in use stand 4 feet in height and the usual type of net carries a taut headline, making the full opening available. For deep-sea work where the possibility of upsetting the frame is great, a reversible net is used, with a running bolt-rope passing through the clips forward of the middle of the shoes. The use of this net is indicated by the abbreviation "rev."

25′ Ag. ....The same runners used in the 12-foot frame but spread by use of two light spars for beams to a 25-foot opening. Used successfully on smooth bottoms.

9′ Alb.-Blk......9-foot Albatross-Blake beam trawl.

B. A............British Admiralty.

3-bd. int.......a net with triangular opening operated by 3 shear boards and handled by a 3-part bridle from dredging cable—in no case successfully.

2′ Blk..........a 2-foot Blake trawl, generally used from a steam launch or rowboat; net made of ½-inch webbing.

botm...........bottom.

C. S............Coast Survey.

D...............dredging, or collecting, station.

dip.............ordinary dip net on a 12-inch or 14-inch ring, with bamboo handle; used extensively in reef fishing with dynamite and from the gang plank with electric light.

dyn ....dynamite.

e. l.............electric light.
H..............hydrographic station.
H. O............U. S. Hydrographic Office.
hbr.............harbor.
int. 3...........intermediate 3. This is a large ship's net on a 5½-foot ring; net about 11 feet long made of no. 0000 grit gauze, with about 3 feet of the bottom of no. 3 silk, and a brass bucket at the bottom. The outside netting is ½-inch webbing for the protection of the silk.
int. 4...........intermediate 4; same as intermediate 3, but with an extension of 6 feet of 1-inch webbing carried to a 10-foot ring, thus increasing the opening to 10 feet.
int. 5...........intermediate 5; similar to intermediate 4, but with no. 14 grit gauze only in the bottom part from the 3-foot ring to the bucket; above this ½-inch webbing to the 5½-foot ring, and thence 6 feet of ¾-inch webbing to the 10-foot ring. Equipped with a funnel of ¾-inch webbing.
9′ Jn. dr.......Johnston oyster dredge. This is an Albatross-Blake beam trawl with a rake bar bolted at the heel. Used also in 6-foot length.
K. 1...........a small plankton or Kofoid net, made of no. 12 silk, on a 14-inch ring.
K. 2...........same as above, but made of no. 20 silk.
K. 4...........same as above, but made of no. 3 silk.
K. 5...........same as K. 2, but made of no. 1 silk.
K. 6...........a net of same length as other Kofoid nets, but provided with clamps on opposite sides of the ring to attach directly to the cable; also with a bail from the ring to the bucket. Designed to lower and hoist with the ship lying to and the cable running vertically, thus making no catch except while ship is underway and towing.
Lt..............light.
Luc. sdr........Lucas sounding machine.
m. b...........mud bag. When more than one mud bag is used the two supplementary bags are rigged one at either end of the trawl frame.
6′ McC..........6-foot McCormick; an adaptation of the Blake trawl frame, with rear beam bolted to bottom shoe and serving as a spindle on which bent teeth of ½ by 2 inch iron work as a rake. Not successful.
2′ o. p.........open plankton net on 2-foot ring; made of no. 1 silk.
spec............specimen.
12′ Tnr.........12-foot Tanner beam trawl.
Tnr.-Blish sdr...Tanner-Blish sounding machine.
therm..........Negretti & Zambra thermometer, with Tanner case.
wat. bot.........Sigsbee water bottle.

* signifies depth as shown by chart when no sounding has been made.
** signifies depth and character of bottom as obtained by sounding at previous station.
‡ signifies nets towed astern, from taffrail, side by side.
§ signifies apparatus towed (horizontally) at depth indicated, during number of minutes given in the first period; then hoisted (vertically) to surface, net open, in time next shown.

The letters (a), (b), (c), (d), (e), when used with the abbreviation for sounding apparatus, indicate the kind of sounding cup used; thus,

(a)...Sigsbee sounding rod.
(b)...Lucas snapper.
(c)...Lucas 4-tube sounding rod.
(d)...bail-cutter.
(e)...ordinary lead with tallow.

"Character of bottom," determined by the specimens from the sounding cup, is expressed by abbreviations, the key to which is appended. It will be noted that these abbreviations are arbitrarily capitalized for nouns. When used as adjectives, however, the noun abbreviations are not capitalized.

bk....black.	fne....fine.	M.......Mud.	sctrd...scattered.
bl.....blue.	For...Foraminifera.	mrgn...marginal.	Sh.....Shells.
br.....brown.	G......Gravel.	Mss....Masses.	sml.....small.
br-gn..brownish-green.	Glob..Globigerina.	Oz....Ooze.	Sp.....Specks.
brk....broken.	gn....green.	P......Pebbles.	St......Stones.
C......Clay.	gn-br..greenish-brown.	Ptr....Pteropod.	vol....volcanic.
Clmps. Clumps.	gn-gy..greenish-gray.	R......Rock.	W......Seaweed.
Co.....Coral.	gy....gray.	Rf......Reef.	wh.....white.
crs.....coarse.	hrd...hard.	rky.....rocky.	
dk.....dark.	Lav....Lava.	S.......Sand.	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Between Honolulu and Manila.					
....	Midway Ids. Harbor........	....	1907. Nov. 7	10.00 a. m.	*fms.*	co. Clmps.; S......
....	.....do....................	....	Nov. 8	9.00 a. m.	....	Co...............
....	Guam; Apra Bay (rf)........	....	Nov. 19	1.00 p. m.	....	mrgn. co. Rf......
....	.....do....................	....	Nov. 20	1.00 p. m.	....	co. Mss...........
....	.....do....................	....	Nov. 21	9.00 a. m.	....	mrgn. Rf; sml. staghorn Clmps; S.
....	.....do....................	....	...do.....	1.00 p. m.	....	co. Mss.; S........
	Manila Bay and vicinity.[a]					
....	Manila Bay (Luneta Beach).	C. S. 4240; Feb., 1907.	Dec. 6	3.00 p. m.	....	M., S.............
....	Manila Bay, inside breakwater (anch.).	.....do......	...do.....	7.00 p. m.	3.5	M.................
....	.....do....................	.....do......	Dec. 7	7.00 p. m.	3.5	M.................
....	.....do....................	.....do......	Dec. 8	7.00 p. m.	3.5	M.................
....	Manila Bay (Malate Beach)..	C. S. 4712... Sept., 1904.	Dec. 9	9.00 a. m.	....	fne. S............
....	Manila Bay, inside breakwater (anch.).	.....do......	...do.....	7.00 p. m.	3.5	M.................
....	Manila Bay, inside breakwater.	.....do......	Dec. 11	8.00 p. m.	....	M.................
....	.....do....................	.....do......	Dec. 12	10.00 a. m.	2	M.................
....	Manila Bay, outside breakwater.	.....do......	...do.....	1.30 p. m.	....	M., sml. R........
....	Manila Bay (Luneta Beach).	.....do......	Dec. 30	9.00 a. m.	....	M., S.............
....	Manila Bay (near anch.).....	.....do......	...do.....	4.00 p. m.	3.5	M.................
	China Sea off southern Luzon.					
D. 5096	Corregidor Lt., N. 2.70 miles (14° 20′ 23″ N., 120° 34′ 15″ E.).	C. S. 4240; Feb., 1907.	1908. Jan. 2	10.42 a. m.	28	gy. M., S., Sh.....
				11.01 a. m.	28	gy. M., S., Sh.....
D. 5097	Corregidor Lt., N. 6° E., 3.60 miles (14° 19′ 15″ N., 120° 33′ 52″ E.).	.....do......	...do.....	11.18 a. m.	*30	gy. M., S., Sh.....
D. 5098	Corregidor Lt., N. 21° E., 4.30 miles (14° 18′ 40″ N., 120° 32′ 40″ E.).	.....do......	...do.....	12.44 p. m.	*38	gy. M., S., Sh.....
D. 5099	Corregidor Lt., N. 36° E., 4.80 miles (14° 18′ 55″ N., 120° 31′ 20″ E.).	.....do......	...do.....	1.21 p. m.	*30	gy. M., S., Sh.....
D. 5100	Corregidor Lt., N. 16° E., 5.70 miles (14° 17′ 15″ N., 120° 32′ 40″ E.).	.....do......	...do.....	2.15 p. m.	35	gy. S.............
				2.22 p. m.	35	gy. S.............
D. 5101	Corregidor Lt., S. 82° E., 10.50 miles (14° 24′ 30″ N., 120° 23′ 20″ E.).	.....do......	Jan. 6	1.16 p. m.	*43	....
D. 5102	Sueste Pt. Lt., S. 85° W., 1.20 miles (14° 45′ N., 120° 12′ 30″ E.).	C. S. 4254; Sept., 1902.	...do.....	4.20 p. m.	*33	....
....	Subig Bay (Subig anch.)....	.....do......	...do.....	7.00 p. m.	11	....
....	Subig Bay, Subig (beach)...	.....do......	Jan. 7	9.00 a. m.	....	S.................
D. 5103	Calaclan Pt., S. 86° E., 2.50 miles (14° 49′ 30″ N., 120° 13′ 30″ E.).	.....do......	...do.....	1.46 p. m.	*20	gy. M.............

[a] From December 16 to 21 a shore party made collections at the mouth of the Santa Cruz River and the adjacent shore of Laguna de Bay and visited the markets at Santa Cruz and Majayjay. A party visited Taal Lake December 24 to 29 and made collections by seining (45′ seine) on the south side of Taal Id., and by purchase from natives on the Pansipit River, and at Taal December 31 and January 1 a shore party made collections on Mariquina River.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dyn.	8–12 ft.	1 00			Work interrupted by storm.
					dyn.	20–30 ft.	2 00			
					dyn.	6–20 ft.	4 00			
					dyn.	6–20 ft.	3 00			
					dyn.	3–10 ft.	3 00			Mostly on shore flat.
					dyn.	6–20 ft.	2 00			
					100′ seine.	4 ft	2 30			5 hauls.
					dip; e. l.	surf.	2 00			
					dip; e. l.	surf.	2 00			
					dip; e. l.	surf.	2 00			
					150′ seine.	6 ft	2 30			Do.
					dip; e. l.	surf.	2 00			
					2′ o. p.	surf.	20			Towed from steam launch.
					2′ Blk.	botm.				Do.
					2′ Blk.	botm.				Several hauls from mouth of Pasig River to outer entrance through breakwater.
					150′ seine.	4 ft	2 30			5 hauls.
					2 wire traps.	botm.				Finally hauled on Jan. 4, 1908.
79.5	79				Tnr.-Blish. sdr. (b).					
79.7	79				9′ Tnr.; m. b.	botm.	21	SW.[a]		Veered 5 fms. during haul, not on bottom; water-haul.
80	79				9′ Tnr.; m. b.	botm.	19	NW. by W.[a]		Veered at 5 minute intervals from 75 to 94 and to 104 fms. Trawl capsized on bottom, but made a small catch.
82	79				9′ Tnr.; m. b.	botm.	20	W. by N.[a]		Net capsized on bottom, but made a small catch.
81	80				9′ Tnr.; m. b.	botm.	20	W. by N.[a]		
86	80				Tnr.-Blish. sdr. (b).					
					9′ Tnr.; m. b.	botm.	20	NE.[a]		
82	78		1.02391		int. 4 §	37 fms.	20 4	NW. ½ W.		70 fms. dredge cable out.
86.5	81		1.02447		int. 4 §	28 fms.	20 3	N. 11° E.		Cable veered from 45 to 57 fms. during haul.
					dip.; e. l.	surf.	2 00			
					250′ seine.	20 ft	2 30			5 hauls.
84	79				12′ Tnr.; m. b.	botm.	20	S. 45° E.	0.6	

[a] Course steered by ship.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	China Sea off southern Luzon—Continued.					
			1908.		*fms.*	
....	Olongapo (beach)............	C. S. 4254; Sept., 1902.	Jan. 7	2.00 p. m.	....	S..................
....	Beach opposite Olongapo....	.....do.....	...do.....	3.30 p. m.	....	grassy............
....	Olongapo (anch.)...........	.....do.....	...do.....	7.00 p. m.	13	....
D. 5104	Sueste Pt. Lt., S. 58° W., 1.30 miles (14° 45′ 48″ N., 120° 12′ 20″ E.).	.....do.....	Jan. 8	10.20 a. m.	*33	(?)...............
D. 5105	Sueste Pt. Lt., N. 57° W., 1.90 miles (14° 43′ 55″ N., 120° 12′ 50″ E.).	.....do.....	...do.....	11.06 a. m.	*25	(?)...............
....	Grande I. (rf.)...............	.....do.....	...do.....	1.00 p. m.	....	sctrd. Clmps. Co...
....	Port Binanga (beach)........	.....do.....	...do.....	2.00 p. m.	....	....
....	Port Binanga (anch.)........	.....do.....	...do.....	7.00 p. m.	6	....
....	Port Binanga (rf.)...........	.....do.....	Jan. 9	8.30 a. m.	....	sctrd. Clmps. Co...
D. 5106	Corregidor Lt., S. 57° E., 2.25 miles (14° 23′ 55″ N., 120° 32′ 33″ E.).	C. S. 4240; Feb., 1907.	...do.....	1.58 p. m.	*37	gy. M............
D. 5107	Corregidor Lt., S. 17° E., 1.75 miles (14° 24′ 30″ N., 120° 33′ 40″ E.).	.....do.....	...do.....	2.38 p. m.	*28	gy. M............
....	Manila Bay (Luneta Beach).	.....do.....	Jan. 13	....	....	fne. S............
....	Limbones Cove (E. shore, beach).	.....do.....	Jan. 14	4.30 p. m.	....	S., P., Co.........
....	Limbones Cove (SW. shore, rf.).	.....do.....	...do.....	4.30 p. m.	....	solid Co..........
....	Limbones Cove (anch.).......	.....do.....	...do.....	7.00 p. m.	10	....
D. 5108	Corregidor Lt., N. 39° E., 22.50 miles (14° 05′ 5″ N., 120° 19′ 45″ E.).	.....do.....	Jan. 15	8.01 a. m.	13	Co................
				8.34 a. m.	13	Co................
				8.47 a. m.	16	Co................
				9.00 a. m.	16	Co................
				9.20 a. m.	16	Co................
D. 5109	Corregidor Lt., N. 42° E., 25.80 miles (14° 03′ 45″ N., 120° 16′ 30″ E.).	.....do.....	...do.....	10.26 a. m.	10	Co................
				10.43 a. m.	12	Co................
D. 5110	Corregidor Lt., N. 20° E., 25 miles (13° 59′ 20″ N., 120° 75′ 45″ E.).	.....do.....	...do.....	3.18 p. m.	135	dk. gy. M.........
				3.32 p. m.	135	dk. gy. M.........
....	Nasugbu Bay (anch.)........	.....do.....	...do.....	7.00 p. m.	10	....
....	Nasugbu Bay (beach near town).	.....do.....	Jan. 16	9.00 a. m.	....	S..................
....	Nasugbu Bay (Pillar Rock, rf.).	.....do.....	...do.....	9.00 a. m.	....	sctrd. Clmps. Co..
D. 5111	Sombrero Id., S. 41° E., 4.50 miles (13° 45′ 15″ N., 120° 46′ 30″ E.).	.....do.....	...do.....	2.38 p. m.	236	....
				3.08 p. m.	236	gn. M............
....	Balayan Bay (Taal anch.)...	.....do.....	...do.....	7.00 p. m.	10	....
D. 5112	Sombrero Id., S. 18° E., 6.75 miles (13° 48′ 22″ N., 120° 47′ 25″ E.).	.....do.....	Jan. 17	2.06 p. m.	177	dk. gn. M.........
				2.33 p. m.	177	dk. gn. M.........
D. 5113	Sombrero Id., S. 7° W., 9.50 miles (13° 51′ 30″ N., 120° 50′ 30″ E.).	.....do.....	...do.....	3.43 p. m.	159	dk. gn. M.........
				4.02 p. m.	159	dk. gn. M.........
	Balayan Bay and Verde Id. Passage.[a]					
....	Balayan Bay (Ligpo Pt. rf.).	C. S. 4240,	Jan. 18	10.00 a. m.	....	dense Co., S.......

[a] Collecting trip to Taal Lake on Jan. 18. Dredging with hand dredge.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					250′ seine	20 ft	1 15			1 haul.
					250′ seine	8 ft	1 15			Do
					dip.; e. l.	surf	2 00			
81	78				12′ Tnr.; m. b.	botm	20	S. 22° W.	0.8	
81	78				12′ Tnr.; m. b.	botm	20	N. 60° W.	(?)	
					dyn.	6–20 ft.	4 30			
					150′ seine		2 00			4 hauls.
					dip.; e. l.	surf	2 00			
					dyn.	6–15 ft.	2 00			
86.5	78		1.02393		12′ Tnr.; m. b.	botm	20	N. 48° E.	1.2	Tail lashing slipped; no catch except in mud bag.
84.5	78		1.02379		12′ Tnr.; m. b.	botm	20	N. 44° E.	1.7	
					150′ seine	4 ft				
					250′ seine	12 ft	1 30			
					dyn.	6–12 ft.	1 30			
					dip.; e. l.	surf	2 00			
80	80	80	1.02406		Tnr.-Blish sdr. (b).					
80	80				9′ Alb.-Blk.; m. b.	botm	1	N. 36° E.		Dredging cable fouled gin block. Trawl not dragged on bottom.
81	80				Tnr.-Blish sdr. (b).					
81	80				8 swabs	botm	10	S.	.3	
81	80				9 hand lines	botm	23			No catch.
82	80		1.02386		9′ Alb.-Blk.	botm	12		(?)	Trawl immediately torn on coral.
82	80				8 swabs	botm	11		(?)	Soundings with hand lead.
89	80	59	1.02406		Tnr.-Blish sdr (b).					
85	80				12′ Tnr.; m. b.	botm	20	N. 20° E.	.6	20 fms. cable veered during haul.
					dip.; e. l.	surf	2 00			
					130′ seine		2 30			
					dyn.	6–15 ft.	3 00			
84	80				Tnr.-Blish sdr. (b).					Sounding cup lost; therm. did not trip.
84	80				12′ Tnr.; m. b.	botm	30	N. 22° E.	1.8	
					dip; e. l.	surf	1 30			
86	80	52.4	1.02416	1.02496	Tnr.-Blish sdr. (b).					
84	80				12′ Tnr.; m. b.	botm	30	N. 13° E.	1.3	
82	80		1.02413		Tnr.-Blish sdr. (e).					
80	80				12′ Tnr.; m. b.	botm	10	N. 9° E.	.6	Uneven bottom.
					dyn.	6–20 ft.	5 00			

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Balayan Bay and Verde Id. Passage—Continued.					
			1908.		*fms.*	
....	Balayan Bay (near beach, Taal).	C. S. 4240; Feb., 1907.	Jan. 19	3.00 p. m.	....	blk. S., M.........
....	Balayan Bay (Taal, anch.)..	.....do.....	...do....	7.00 p. m.	10	....
....	Maricaban Id. (rf. inside Sepoc Pt.).	.....do.....	Jan. 20	9.00 a. m.	....	dense Co., S.......
D. 5114	Sombrero Id. N. 36° E., 7.2 miles (13° 36′ 11″ N., 120° 45′ 26″ E.).	.....do.....	...do....	10.49 a. m.	340	fne. S............
				11.17 a. m.	340	fne. S............
D. 5115	Sombrero Id. N. 49° E., 7.30 miles (13° 37′ 11″ N., 120° 43′ 40″ E.).	.....do.....	...do....	1.08 p. m.	340	(?)...............
				1.41 p. m.	340	(?)...............
D. 5116	Sombrero Id. N. 69° E., 2.50 miles (13° 41′ N., 120° 47′ 05″ E.).	.....do.....	...do....	2.53 p. m.	200	(?)...............
				3.13 p. m.	200	(?)...............
D. 5117	Sombrero Id. S. 17° E., 10.80 miles (13° 52′ 22″ N., 120° 46′ 22″ E.).	.....do.....	Jan. 21	9.10 a. m.	118	(?)...............
				9.27 a. m.	118	dk. gn. M.........
D. 5118	Sombrero Id. S. 47° E., 10 miles (13° 48′ 45″ N., 120° 41′ 51″ E.).	.....do.....	...do....	10.41 a. m.	159	dk. gn. M.........
				11.00 a. m.	159	dk. gn. M ....
D. 5119	Sombrero Id. S. 80° E., 18.90 miles (13° 45′ 05″ N., 120° 30′ 30″ E.).	.....do.....	...do....	1.24 p. m.	394	gn. M., S..........
				1.56 p. m.	394	gn. M., S..........
D. 5120	Sombrero Id., S. 79° 30′ E., 19.2 miles (13° 45′ 30″ N., 120° 30′ 15″ E.).	.....do.....	...do....	2.41 p. m.	393	gn. M., S..........
				3.10 p. m.	393	....
....	Nasugbu Bay (anch.).......	.....do.....	...do....	7.30 p. m.	10	....
....	Manila Bay (inside breakwater).	.....do.....	Jan. 28	11.00 a. m.	....	....
....	Manila Bay (inside breakwater, anch.).	.....do.....	Jan. 31	10.00 a. m.	....	....
	East coast of Mindoro.					
D. 5121	Malabrigo Lt., N. 14° W., 9 miles (13° 27′ 20″ N., 121° 17′ 45″ E.).	C. S. 4714; June, 1906.	Feb. 2	8.14 a. m.	108	dk. gn. M.........
				8.30 a. m.	108	dk. gn. M.........
D. 5122	Malabrigo Lt., N. 46° W., 20.60 miles (13° 21′ 30″ N., °120 30′ 33″ E.).	.....do.....	...do....	10.34 a. m.	220	gn. M............
				10.59 a. m.	220	gn. M............
D. 5123	Malabrigo Lt., N. 44° W., 32.50 miles (13° 12′ 45″ N., 121° 38′ 45″ E.).	.....do.....	...do....	1.09 p. m.	283	gn. M............
				1.44 p. m.	283	gn. M............
D. 5124	Pt. Origon (N.), S. 56° E., 20.75 miles (12° 52′ N., 121° 48′ 30″ E.).	.....do.....	...do....	5.04 p. m.	281	sft. gn. M.........
				5.38 p. m.	281	sft. gn. M.........
	Sulu Sea, vicinity southern Panay.					
D. 5125	Nogas Id. (W.), S. 11° E., 24 miles (10° 48′ N., 121° 48′ 30″ E.).	C. S. 4718, Dec., 1906.	Feb. 3	9.07 a. m.	411	gn. M............
				9.41 a. m.	411	....
D. 5126	Nogas Id. (W.), S. 26° 30′ E., 11.75 miles (10° 34′ 45″ N., 121° 47′ 30″ E.).	.....do.....	...do....	1.05 p. m.	742	sft. gn. M.........
				2.00 p. m.	742	sft. gn. M.........
....	Naso Pt., Panay (anch.)....	.....do.....	...do....	7.00 p. m.	10	....
....	Naso Pt., Panay (near anch.)	.....do.....	...do....	7.00 p. m.	....	....
....	Naso Pt., Panay (beach)....	.....do.....	Feb. 4	8.30 a. m.	....	....
....	Naso Pt., Panay (shore, tide pools).	.....do.....	...do....	9.00 a. m.	....	....

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					250 fm. seine		2 00			Purse seine owned and hauled by native fishermen.
					dip.; e. l.	surf.	1 30			
					dyn.	6–20 ft.	5 00			
81.5	79		1.02447		Luc. sdr. (e).					
84	80				12′ Tnr.; m. b.	botm.	20	N. 54° E.	0.5	Cable veered from 460 to 520 fms. during haul.
82	80	(?)	1.02434	1.02454	Luc. sdr. (b).					Sounding cup did not close. Therm. not properly attached and fouled water bottle.
83	80				12′ Tnr.; m. b.	botm.	20	N. 43° E.	1.0	
86	80	50.2	1.02426		Luc. sdr. (b).					Therm. not properly attached; fouled stray line.
86	80				12′ Tnr.; m. b.	botm.	20	N. 5° E.	0.5	
82	79		1.02475		Tnr.-Blish sdr. (b).					No specimen in sounding cup.
82	79				12′ Tnr.; m. b.	botm.	20	N. 31° W.	0.8	
81	79		1.02426		Tnr.-Blish sdr. (b).					
81	79				12′ Tnr.; m. b.	botm.	30	N. 50° W.	0.8	
82	80	43.7	1.02386	1.02468	Luc. sdr. (b).					
82	80				12′ Tnr.; m. b.	botm.	9	N. 23° E.	1.0	
82	80	43.7	1 02386	1.02480	Luc. sdr. (b).					
82	80				int. 4 §.	350 fms.	20 17	N. 5° W.	1.0	393 fms. dredge cable out.
					dip.; e. l.	surf.	1 30			
					2′ o. p.	surf.	15			Towed from steam launch.
					dyn. cap.; dip.	surf.				
76	79		1.02420		Tnr.-Blish sdr. (b).					
76	79				12′ Tnr.; m. b.	botm.	20	S. 79° E.	1.0	
78	79		1.02489		Tnr.-Blish sdr. (b).					Snapper failed to close.
79	79				12′ Tnr.; m. b.	botm.	20	S. 59° E.	1.3	
80	79		1.02475		Tnr.-Blish sdr. (b).					Do.
79	79				12′ Tnr.; m. b.	botm.	20	S. 6° W.	1.3	
82	79		1.02468		Tnr.-Blish sdr. (b).					Do.
80.5	79				12′ Tnr.; m. b.	botm.	17	S. 9° W.	1.5	
81	80	50	1.02444	1.02475	Luc. sdr. (b).					
83.5	80				int. 4 §.	365 fms.	20 26	N. 62° W.	1.5	550 fms. dredge cable out.
83	80	49.5	(?)	(?)	Luc. sdr. (a).					No specimen in water bottle.
84	80				12′ Tnr.; m. b.	botm.	20	N. 81° W.	1.5	
					dip.; e. l.	surf.	1 30			
					5 gill nets	botm. and surf.				Set over night.
					130′ seine	10 ft.	3 00			6 hauls.
					copper sulphate.		2 00			

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Sulu Sea, vicinity southern Panay—Continued.					
			1908.		*fms.*	
D. 5127	Nogas Id. (W.), N. 11° 30′ E., 22 mile (10° 02′ 45″ N., 121° 48′ 15″ E.).	C. S. 4718; Dec., 1906.	Feb. 4.	2.57 p. m.	958	gy. M., Glob
				4.06 p. m.	958	gy. M., Glob
D. 5128	Nogas Id. (W.), N. 6° E., 32.50 miles (9° 52′ 10″ N., 121° 49′ 35″ E.).	do	do	7.05 p. m.		
	Sulu Sea off western Mindanao.					
H. 4897	Dulunguin Pt., S. 70° E., 4.80 mile (7° 46′ N., 122° E.).	C. S. 4723, Oct., 1905.	Feb. 5	11.43 a. m.	1,570	gy. M., Glob
H. 4898	Dulunguin Pt., N. 50° E., 1 mile (7° 43′ 45″ N., 122° 03′ 45″ E.).	do	do	1.13 p. m.	221	gy. M., Glob
D. 5129	Dulunguin Pt., N. 44° E., 3.80 miles (7° 41′ 30″ N., 122° 01′ 45″ E.).	do	do	2.04 p. m.	0–100	
				2.23 p. m.		
D. 5130	Dulunguin Pt., N. 1° W., 9.50 miles (7° 35′ N., 122° 04′ 45″ E.).	do	do	3.29 p. m.	102	
				3.48 p. m.	102	
....	Panabutan Bay (NW. beach, near river).	C. S. 4644; July, 1905.	do	5.00 p. m.		sft. M., S
....	Panabutan Bay (anch.)	do	do	7.30 p. m.	11	
H. 4899	Id. off Panabutan Pt., S. 78° W., 3 miles.	do	Feb. 6	8.48 a. m.	18	sft. gn. M
H. 4900	Id. off Panabutan Pt., W., 0.30 mile.	do	do	8.58 a. m.	19	sft. gn. M
H. 4901	Id. off Panabutan Pt., N. 52° W., 0.30 mile.	do	do	9.04 a. m.	21	gn. M., S
....	Panabutan Bay (beach)	do	do	9.00 a. m.		S., M
....	Panabutan Bay (Siriguay Pt., rf.).	do	do	9.00 a. m.		sctrd. Co
H. 4902	Id. off Panabutan Pt., N. 31° W., 0.50 mile.	do	do	9.10 a. m.	23	gn. M., fne S
H. 4903	Id. off Panabutan Pt., N. 15° W., 0.50 mile.	do	do		27	co. S
D. 5131	Id. off Panabutan Pt., N. 20° E., 0.40 mile.	do	do	9.14 a. m.	27	gn. M., co. S
				9.27 a. m.	27	gn. M., co. S
D. 5132	Id. off Panabutan Pt., N. 15° W., 0.30 mile.	do	do	9.54 a. m.	*26	gn. M., S
H. 4904	Id. off Panabutan Pt., N. 62° E., 0.30 mile.	do	do	10.23 a. m.	38	gn. M., S
D. 5133	Id. off Panabutan Pt., N. 52° E., 1.50 miles.	do	do	10.28 a. m.	38	gn. M., S
				10.40 a. m.	38	gn. M., S
....	Caldera Bay (anch.)	do	do	7.30 p. m.		
	Sulu Archipelago, near Basilan Id.					
D. 5134	Balukbaluk Id. (N.) S. 59° W., 6.25 miles (6° 44′ 45″ N., 121° 48′ E.).	C. S. 4511; Dec., 1904.	Feb. 7	7.14 a. m.	25	fne. S
				7.22 a. m.	25	fne. S
D. 5134a	Balukbaluk Id. (N.), S. 59° W., 4.90 miles (6° 44′ 12″ N., 121° 46′ 55″ E.).	do	do	7.54 a. m.	34	gy. S
				8.05 a. m.	34	gy. S

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
84.5	80	50.1	1.02477	1.02516	Luc. sdr. (a)					
83	81				9′ alb.-Blk.; 2 m. b.	botm	20	N. 9° W.	(?)	4.25 mi. distance given by recorder.
82	80				int. 4	surf	20	S. 6° E.	0.6	
82	80				Luc. sdr. (a)					
82	80				Tnr.-Blish sdr. (b).					First attempt resulted in loss of all the apparatus used.
81	80	57.6	1.02482		Tnr.-Blish sdr.					Density at 100 fms. 1.02495.
80	80				int. 4 §	100 fms.	20 8	S. 31° W.	1.3	193 fms. dredge cable out.
81.5	79.5	59.2	1.02447	1.02451	Luc. sdr. (a)					
80.5	80				9′ alb.-Blk	botm				Trawl fouled bottom and carried away.
					130′ seine	12 ft	30			1 haul.
					dip.; e. l.	surf	2 00			
					Tnr.-Blish sdr. (e).					
					Tnr.-Blish sdr. (e).					
					Tnr.-Blish sdr. (e).					
					175′ seine		2 00			
					dyn	8–15 ft.	2 00			Water brackish. Coral unthrifty.
					Tnr.-Blish sdr. (e).					
					Tnr.-Blish sdr. (e).					
88	79		1.02447		Tnr.-Blish sdr. (e).					
88	79				9′ Tnr.; m. b.	botm	13	N. 43° E.	.3	
85	79		1.02447		9′ Tnr.; m. b.	botm	20	S. 69° W.	.7	
					Tnr.-Blish sdr. (e).					
85.5	79.5		1.02447		Tnr.-Blish sdr. (e).					
85	80				9′ Tnr.; m. b.	botm	16	S. 21° E.	.4	
					2′ o. p.	surf	20			Set in tide current at gangway.
82	78	?	1.02497		Tnr.-Blish sdr. (e).					Therm. not allowed time to set.
81	78				9′ Tnr.; m. b.	botm	20	S. 42° W.	.9	Ship drifted to position of 5134a while getting apparatus ready.
83	78	76.2			Tnr.-Blish sdr. (e).					15 sec. allowed for therm. to set.
83	78				int. 4 §	25 fms.	20 2	N. 26° E.	.9	50 fms. dredge cable out.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Vicinity of Jolo.		1908.		*fms.*	
D. 5135	Jolo Lt., S. 46° W., 11.90 miles (6° 11′ 50″ N., 121° 08′ 20″ E.).	C. S. 4542; Apr., 1903.	Feb. 7	2.29 p. m.	161	fne. co. S.
				2.50 p. m.	161	fne. co. S.
....	Jolo (anch.)	....do.	...do.	7.30 p. m.	14	
....	....do.	....do.	Feb. 8	7.30 p. m.	14	
....	Marongas Id., S. side	....do.	Feb. 10	1.30 p. m.	....	sctrd. Co., S.
....	Pangasinan Id., S. Pt. (rf)	....do.	Feb. 13	3.00 p. m.	....	sctrd. Co
....	Jolo (anch.)	....do.	...do.	7.30 p. m.	14	
D. 5136	Jolo Lt., S. 37° E., 0.70 mile (6° 04′ 20″ N., 120° 59′ 20″ E.).	....do.	Feb. 14	8.50 a. m.	22	S., Sh
				9.07 a. m.	22	S., Sh
D. 5137	Jolo Lt., S. 61° E., 1.30 miles (6° 04′ 25″ N., 120° 58′ 30″ E.).	....do.	...do.	9.44 a. m.	20	S., Sh
				9.55 a. m.	20	S., Sh
D. 5138	Jolo Lt., S. 19° E., 2.50 miles (6° 06′ N., 120° 58′ 50″ E.).	....do.	...do.	10.50 a. m.	19	S., Co
				10.55 a. m.	19	S., Co
D. 5139	Jolo Lt., S. 51° W., 3.60 miles (6° 06′ N., 121° 02′ 30″ E.).	....do.	...do.	1.02 p. m.	20	co. S
				1.13 p. m.	20	co. S
D. 5140	Jolo Lt., S. 33° W., 6.10 miles (6° 08′ 45″ N., 121° 03′ E.).	....do.	...do.	1.58 p. m.	76	fne. co. S
				2.09 p. m.	76	fne. co. S
....	Bubuan Id., S. Pt. (rf.)	....do.	...do.	4.00 p. m.	....	co. Mss
....	Bubuan Id. (anch.)	....do.	...do.	7.30 p. m.	12	
D. 5141	Jolo Lt., S. 17° E., 5.50 miles (6° 09′ N., 120° 58′ E.).	....do.	Feb. 15	8.39 a. m.	29	co. S
				8.47 a. m.	29	co. S
D. 5142	Jolo Lt., S. 50° W., 3.90 miles (6° 06′ 10″ N., 121° 02′ 40″ E.).	....do.	...do.	10.26 a. m.	21	co. S., Sh
				10.33 a. m.	21	co. S., Sh
D. 5143	Jolo Lt., S. 50° W., 3.40 miles (6° 05′ 50″ N., 121° 02′ 15″ E.).	....do.	...do.	11.05 a. m.	19	co. S
				11.09 a. m.	19	co. S
D. 5144	Jolo Lt., S. 50° W., 3.40 miles (6° 05′ 50″ N., 121° 02′ 15″ E.).	....do.	...do.	11.19 a. m.	19	co. S
				11.26 a. m.	19	co. S
D. 5145	Jolo Lt., S. 16° E., 0.85 mile (6° 04′ 30″ N., 120° 59′ 30″ E.).	....do.	...do.	1.37 p. m.	23	co. S., Sh
				1.44 p. m.	23	co. S., Sh
	Sulu Archipelago, vicinity of Siasi.					
D. 5146	Sulade Id. (E.), N. 18° W., 3.40 miles (5° 46′ 40″ N., 120° 48′ 50″ E.).	C. S. 4542; Apr., 1903.	Feb. 16	10.04 a. m.	24	co. S., Sh
				10.11 a. m.	24	co. S., Sh
D. 5147	Sulade Id. (E.), N. 3° E., 8.40 miles (5° 41′ 40″ N., 120° 47′ 10″ E.).	....do.	...do.	11.20 a. m.	21	co. S., Sh
				11.27 a. m.	21	co. S., Sh
D. 5148	Sirun Id. (N.), S. 80° W., 3.80 miles (5° 35′ 40″ N., 120° 47′ 30″ E.).	C. S. 4544; Oct., 1906.	...do.	1.00 p. m.	17	co. S
				1.07 p. m.	17	co. S
H. 4905	Sirun Id. (W.), N. 33° E., 2.43 miles (5° 32′ 50″ N., 120° 42′ 15″ E.).	....do.	Feb. 18	....	10	S., Co., Sh
D. 5149	Sirun Id. (W.), N. 39° E., 2.40 miles (5° 33′ N., 120° 42′ 10″ E.).	....do.	...do.	9.26 a m.	10	Co., Sh
				9.32 a. m.	10	Co., Sh
D. 5150	Sirun Id. (W.), N. 34° E., 11.7 miles (5° 23′ 20″ N., 120° 35′ 45″ E.).	C. S. 4514; Jan., 1906.	...do.	11.37 a. m.	21	co. S., Sh
				11.43 a. m.	21	co. S., Sh

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
80.5	80	57.4	1.02457		Tnr.-Blish sdr. (e).					
80.5	81				12′ Tnr.; m. b.	botm.	20	S. 26° W.	1.0	
					dip. e. l.	surf.	2 00			
					dip. e. l.	surf.	2 00			
					diving	4-8 ft.	3 00			Coral heads taken ashore.
					dyn.	5-12 ft.	2 00			
					dip. c. l.	surf.	1 30			
84	80		1.02489		Tnr.-Blish sdr. (e).					
83	79				12′ Agz.; 2 m. b.	botm.	20	N. 72° W.	0.6	Lead line carried away.
84	80				Tnr.-Blish sdr. (e).					
84	80				12′ Agz.; 2 m. b.	botm.	20	N. 27° W.	0.6	
85	80				Tnr.-Blish sdr. (e).					
85	80				12′ Agz.; 2 m. b.	botm.	20	N. 15° E.	0.6	1 mud bag carried away.
83	80		1.02457		Tnr.-Blish sdr. (e).					
83	80				12′ Agz.; m. b.	botm.	04	S. 45° E.	0.2	
83	80		1.02477		Tnr.-Blish sdr. (e).					
83	82				12′ Agz. rev.; m. b.	botm.	20	N. 70° W.	0.8	
					dyn.	8-20 ft.	1 00			
					dip.; e. l.	surf.	1 30			
81	78		1.02461		Tnr.-Blish sdr. (e).					
81	78				12′ Agz.; m. b.	botm.	18	N. 13° E.	0.5	
87	80		1.02503		Tnr.-Blish sdr. (e).					
88	80				12′ Agz.; m. b.	botm.	11	W.	0.5	1 bridle-stop carried away.
89	80		1.02442		Tnr.-Blish sdr. (e).					Sounding lead carried away.
89	80				12′ Agz.; m. b.	botm.	4			Fouled bottom; mud bag torn; no distance made.
91	81		1.02514		Tnr.-Blish sdr. (e).					
91	81				12′ Agz.; m. b.	botm.	20	N. 45° W.	0.6	
88	77		1.02482		Tnr.-Blish sdr. (e).					
88	77				12′ Agz.; m. b.	botm.	15	S.	.6	
82	80		1.02468		Tnr.-Blish sdr. (e).					
82	81				12′ Agz.; m. b.	botm.	20	N. 77° W.	1.1	
85	80		1.02447		Tnr.-Blish sdr. (e).					
84	80				12′ Agz.; m. b.	botm.	20	S. 72° E.	.4	
82.5	80		1.02523		Tnr.-Blish sdr. (e).					
82.5	80				12′ Agz., m. b.	botm.	18	S. 51° E.	.7	
					Tnr.-Blish sdr. (e).					
81	78		1.02509		Tnr.-Blish sdr. (e).					
84	78				12′ Agz.; m. b.	botm.	20	N. 10° W.	.8	
82	78		1.02495		Tnr.-Blish sdr. (e).					
82	78				12′ Agz.; m. b.	botm.				Net fouled bottom; 1 bridle stop carried away; no distance made.

Dredging and Hydrographic Records of the U. S. Fisheries

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Sulu Archipelago, Tawi Tawi Group.		1908.		*fms.*	
D. 5151	Sirun Id. (C.), N. 58° E., 19.3 miles (5° 24′ 40″ N., 120° 27′ 15″ E.).	C. S. 4514; Jan., 1906.	Feb. 18	1.02 p. m. 1.07 p. m.	24 24	co. S., Sh co. S., Sh
D. 5152	Pajumajan Id. (W.), S. 2° W., 2 miles (5° 22′ 55″ N., 120° 15′ 45″ E.).	do	do	3.21 p. m. 3.28 p. m.	34 34	wh. S wh. S
....	Dos Amigos Bay (anch.)	do	do	7.30 p. m.	7	
D. 5153	Tocanhi Pt., S. 27° E., 2.10 miles (5° 18′ 10″ N., 120° 2′ 55″ E.).	do	Feb. 19	9.00 a. m. 9.08 a. m.	49 49	co. S., Sh co. S., Sh
D. 5154	Bakun Pt., S. 11° W., 0.70 mile (5° 14′ 50″ N., 119° 58′ 45″ E.).	H. O. 1852; Apr., 1900.	do	10.23 a. m. 10.35 a. m.	12 12	co. S co. S
D. 5155	Bakun Pt., N. 70° E., 1.70 miles (5° 13′ 40″ N., 119° 57′ 20″ E.).	do	do	11.00 a. m. 11.04 a. m.	12 12	co. S co. S
....	Tataan Pass, Simulac Id. (S. end Basun Channel).	do	do	2.00 p. m. 7.00 p. m.		mrgn. co. Rf
....	Simulac Id. (S. end Basun Channel).	do	Feb. 20	8.30 a. m. 1.30 p. m.		mrgn. co. Rf mrgn. co. Rf
....	Tataan Pass (anch.)	do	do	7.30 p. m.	9	
....	Tataan Pass (Simulac Id., rf.)	do	Feb. 21	8.30 a. m.		mrgn. co. Rf
D. 5156	Tinakta Id. (N.), S. 77° W., 3.40 miles (5° 12′ 50″ N., 119° 55′ 55″ E.).	do	do	8.35 a. m. 8.43 a. m.	18 18	fne. S., Sh fne. S., Sh
D. 5157	Tinakta Id. (N.), S. 80° W., 3.30 miles (5° 12′ 30″ N., 119° 55′ 50″ E.).	do	do	8.59 a. m. 9.04 a. m.	18 18	fne. S fne. S
D. 5158	Tinakta Id. (N), N. 89° W., 1.90 miles (5° 12′ N., 119° 54′ 30″ E.).	do	do	9.21 a. m. 9.28 a. m.	12 12	crs. S., Sh crs. S., Sh
D. 5159	Tinakta Id. (N.), N. 82° W., 1.40 miles (5° 11′ 50″ N., 119° 54′ E.).	do	do	10.04 a. m. 10.08 a. m.	10 10	co. S co. S
....	Simulac Id. (rf.)	do	do	1.30 p. m.		mrgn. co. Rf
....	Tataan Pass (anch.)	do	do	7.30 p. m.	9	
D. 5160	Tinakta Id. (N.), S. 72° W., 2.75 miles (5° 12′ 40″ N., 119° 55′ 10″ E.).	do	Feb. 22	8.26 a. m. 8.29 a. m.	12 12	S S
D. 5161	Tinakta Id. (E.), N. 12° W., 1.80 miles (5° 10′ 15″ N., 119° 53′ E.).	do	do	9.03 a. m. 9.07 a. m.	16 16	fne. S., blk. Sp fne. S
H. 4906	Tinagta Id. (S), N. 63° E., 4.10 miles (5° 09′ 55″ N., 119° 48′ 55″ E.).	C. S. 4514; Jan., 1906.	do	9.51 a. m.	55	S., brk. Sh
D. 5162	Tinagta Id. (S.), N. 71° W., 5.40 miles (5° 10′ N., 119° 47′ 30″ E.).	do	do	10:10 a. m. 10.31 a. m.	230 230	 crs. S., brk. Sh
....	Bongao (anch.)	do	do	7.30 p. m.	6	
....	Bongao (near anch.)	do	do	7.30 p. m.		
....	Sanguisiapo Id. (rf.)	do	Feb. 24	9.00 a. m.		sml. Clmps. Co., S.
D. 5163	Observation Id., N. 79° W., 6.70 miles (4° 59′ 10″ N., 119° 51′ E.).	do	do	9.36 a. m. 9.43 a. m.	28 28	co. S co. S
D. 5164	Observation Id., S 82° W., 8 miles (5° 01′ 40″ N., 119° 52′ 20″ E.).	do	do	10.16 a. m. 10.21 a. m.	18 18	gn. M gn. M
D. 5165	Observation Id., N. 70° W., 6.40 miles (4° 58′ 20″ N., 119° 50′ 30″ E.).	do	do	1.19 p. m.	*9	Co
D. 5166	Observation Id., N. 20° W., 4.60 miles (4° 56′ 10″ N., 119° 46′ E.).	do	do	2.54 p. m. 3.05 p. m.	97 97	co. S co. S
....	Simonor Id., N. side (rf.)	do	do	3.15 p. m.		solid Co
D. 5167	Observation Id., N. 11° W., 5.60 miles (4° 55′ 10″ N., 119° 45′ 30″ E.).	do	do	3.36 p. m. 3.53 p. m.	110 110	Co.* Co.*

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
90	80		1.02489		Tnr.-Blish sdr. (e).					
90	80				12′ Agz.; m. b.	botm.	20	N. 86° E.	.4	
87	81		1.02457		Tnr.-Blish sdr. (e).					
86	81				12′ Agz.; m. b.	botm.	15	S. 56° W.	.5	
					dip; e. l.	surf.	1 30			
84	80		1.02437		Tnr.-Blish sdr. (e).					
85	80				12′ Agz.; m. b.	botm.	14	N. 27° W.	.4	
85	81		1.02437		Tnr.-Blish sdr. (e).					
88	81				12′ Agz.; m. b.	botm.	15	S. 42° W.	.3	
84	81		1.02437		Tnr.-Blish sdr. (e).					
84	81				int. 4 §.	8 fms.	21 2	S. 58° W.	.3	20 fms. dredge cable out.
					dyn.	5–30 ft.	3 00			
					4 gill nets					Set over night.
					dyn.	5–40 ft.	3 00			
					dyn.	5–40 ft.	3 00			Channel between reefs.
					dip; e. l.	surf.	30			
					dyn.	6–20 ft.	3 00			
79	79		1.02422		Tnr.-Blish sdr. (e).					
79	79				9′ Jn. dr.	botm.	2	S. 28° E.	.1	
79	79		1.02422		Tnr.-Blish sdr. (e).					
79	79				9′ Jn. dr.	botm.	5	S. 29° W.	.2	
80	79		1.02422		Tnr.-Blish sdr. (e).					
80	79				9′ Jn. dr.	botm.	4	N. 80° W.	.1	
83	80		1.02422		Tnr.-Blish sdr. (e).					
83	80				9′ Jn. dr.	botm.	2	S. 14° E.	.2	
					dyn.	6–20 ft.	3 00			
					dip. e. l.	surf.	1 00			
85	82				Tnr.-Blish sdr. (e).					
85	82				9′ Jn. dr.	botm.	3	S. 67° W.	.2	
90	82				Tnr.-Blish sdr. (e).					
90	82				9′ Jn. dr.	botm.	1	S.	.1	Net fouled bottom.
94	82	63.5			Luc. sdr. (a).					
90	82	52.9	1.02447		Luc. sdr. (a).					
85	82				12′ Agz.; m. b.	botm.	15	S. 9° E.		
					dip; e. l.	surf.			.4	
					4 gill nets					Final haul Feb. 24.
					dyn.	6–15 ft.	2 30			
91	77		1.02447		Tnr.-Blish sdr. (e).					
91	77				9′ Jn. dr.	botm.	4	N. 63° W.	.3	
89	80		1.02442		Tnr.-Blish sdr. (e).					
90	80				9′ Jn. dr.	botm.	8	N. 30° E.	.4	
84	80		1.02495		9′ Jn. dr.	botm.	4	S.	.2	No sounding taken.
83	81	69.4	1.02644		Tnr.-Blish sdr. (e).					
83	81				12′ Agz.; m. b.	botm.	2	S. 5° E.	(?)	Distance recorded .7 mile; 1 bridle stop carried away.
					dyn.	6–15 ft.	2 00			
82	80		1.02406		Luc. sdr. (a).					
82	80				12′ Agz.; m. b.	botm.	20	S. 14° W.	1.4	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Sulu Archipelago, Tawi Tawi Group—Continued.		1908.		*fms.*	
D. 5168	Observation Id. N. 17° W., 4.20 miles (4° 56′ 30″ N., 119° 45′ 40″ E.).	C. S. 4514; Jan., 1906.	Feb. 25	7.09 a. m.	80	co. S.
				7.23 a. m.	80	co. S.
	Sulu Archipelago, vicinity Sibutu Id.					
	Sitanki (anch.)	C. S. 4722; Apr., 1905.	Feb. 25	7.30 p. m.		
	Sitanki (near anch.)	do	do	7.30 p. m.		
	Tumindao Reef S. end (rf.)	do	Feb. 26	9.00 a. m.		sctrd. Clmps. Co.
				1.30 p. m.		sctrd. Clmps. Co.
D. 5169	Sibutu Id. (S. E.), N. 38° E., 8 miles (4° 32′ 15″ N., 119° 22′ 45″ E.).	do	Feb. 27	8.36 a. m.	*10	co. S.
	Sitanki wharf	do	do	10.00 a. m.		S., M., Co.
D. 5170	Sibutu Id. (S. end), N. 38° E., 13.50 miles (4° 28′ N., 119° 19′ 30″ E.).	do	do	11.06 a. m.	128	crs. S.
				11.17 a. m.	128	crs. S.
H. 4907	Sibutu Id. (S. end), N. 10° E., 13.50 miles (4° 26′ N., 119° 25′ 30″ E.).	do	do	12.51 p. m.	850	gn. M.
D. 5171	Omapui Id. (W.), S. 22° W., 12 miles (5° 05′ N., 119° 28′ E.).	do	Feb. 28	3.21 p. m.	250	fne. co. S.
				3.47 p. m.	250	fne. co. S.
	Sandakan and vicinity.					
	Sandakan (near anch.)	B. A. 950	Feb. 29	8.15 p. m.	7	
	Sandakan (anch.)	do	do	8.15 p. m.	7	
			Mar. 1	8.00 p. m.	7	
	Sandakan (beach above fishermen's village).	do	Mar. 2	2.00 p. m.		S., R.
	Vicinity of Jolo.					
	Usada Id., S. end (rf.)	C. S. 4722; Apr., 1905.	Mar. 5	9.00 a. m.		sctrd. Co.
D. 5172	Jolo Lt., E., 24.75 miles (6° 03′ 15″ N., 120° 35′ 30″ E.).	do	do	10.06 a. m.	318	fne. S., Sh.
				10.31 a. m.	318	fne. S., Sh.
H. 4908	Jolo Lt., N. 78° E., 7.50 miles (6° 02′ 30″ N., 120° 52′ 20″ E.).	C. S. 4542; Apr., 1903.	do	2.27 p. m.	171	Sh., Co.
D. 5173	Jolo Lt., N. 82° E., 6.75 miles (6° 02′ 55″ N., 120° 53′ E.).	do	do	2.39 p. m.	186	Sh., Co.
				2.57 p. m.	186	Sh., Co.
D. 5174	Jolo Lt., E. 2.60 miles (6° 03′ 45″ N., 120° 57′ E.).	do	do	3.46 p. m.	20	crs. S.
				3.51 p. m.	20	crs. S.
	Jolo (anch.)	do	do	4.00 p. m.		sctrd. Co.
	Jolo (rf. near anch., north)	do	Mar. 6	9.00 a. m.		Co., S.
	Jolo (beach, west of town)	do	do	2.00 p. m.		S., Co., grassy
	Jolo (near anch.)	do	do	4.00 p. m.	10	S.
	Jolo (west ol anch.)	do	Mar. 7	9.00 a. m.		S., Co. (staghorn Mss.).

Steamer Albatross in the Philippine Islands, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
79	79		1.02386		Luc. sdr. (e)					
79.5	79				12′ Agz.; m. b.	botm	3	S.	(?)	Net fouled bottom.
					dip; e. l.	surf.	1 00			
					4 gill nets					Set over night.
					dyn.	9–15 ft.	3 00			
					dyn.	9–15 ft.	3 00			
81	79		1.02509		9′ Jn. dr.	botm	5	S. 11° W.	.2	No sounding.
					dyn.	12–15 ft.	1 00			
0.5	78		1.02426		Luc. sdr. (e)					
81	78				12′ Agz.; m. b.	botm	2	S. 27° E.	(?)	Distance recorded, 0.5 mile; 1 bridle stop carried away.
82	79				Luc. sdr. (a)					
76	83	53.5	1.02373	1.02462	Luc. sdr. (a)					
76	83				12′ Agz.; m. b.	botm	20	S. 45° W.	(?)	Distance not obtainable on account of fog.
					2′ o. p.	surf.	15			Towed from steam launch.
					dip; e. l.	surf.	1 30			
					dip; e. l.	surf.	1 30			
					130′ seine	12 ft.	3 30			6 hauls.
					dyn.	6–12 ft.	2 00			
84	82		1.02447		Luc. sdr. (a)					Temperature at 277 fms. 53.3. Density at 277 fms. 1.02462.
85	82				12′ Agz.; m. b.	botm	20	N. 47° W.	1.0	Net slightly damaged.
96	84				Tnr.-Blish sdr. (b).					
99	83		1.02518		Tnr.-Blish sdr. (b).					
93	83				9′ Jn. dr.	botm	6	E.	(?)	Distance recorded 0.7 mile.
100	82				Tnr.-Blish sdr. (e).					
100	82				9′ Jn. dr.	botm	6	N. 58° E.	.4	
					4 gill nets					Hauled and shifted about 7 p. m.; not found on following morning.
					dyn.	8 ft.	3 00			
					130′ seine	4 ft.	2 00			4 hauls; 1 at mouth of stream.
					4 traps	botm.				Hauled following morning and at 1 p. m.
					dyn.	4–10 ft.	3 00			

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Sulu Sea, S. E. of Cagayanes Ids.		1908.		*fms.*	
D. 5175	Manucan Id. (E.), N. 45° W., 23.25 miles (9° 21′ N., 121° 37′ 45″ E.).	C. S. 4717; Feb., 1903.	Mar. 8	7.22 p. m.	*	....
	Manila Bay.					
....	Manila Bay (Luneta beach)..	C. S. 4240; Feb., 1907.	Mar. 16	9.00 a. m.	....	S., M...........
....	Cavite (Sangley Pt. beach)..	.....do.....	Mar. 23	9.00 a. m.	....	S...............
	Verde Id. Passage.					
D. 5176	Escarceo Lt., S. 57° E., 7 miles (13° 35′ 15″ N., 120° 53′ 20″ E.).	C. S. 4240; Feb., 1907.	Mar. 24	7.01 p. m.	*260	*S...............
D. 5177	Escarceo Lt., S. 53° E., 5.80 miles (13° 35′ N., 120° 54′ 36″ E.).	.....do.....	...do....	7.33 p. m.	*260	*S...............
	Vicinity of Romblon.					
D. 5178	Pt. Origon (N.), S. 5° E., 2.30 miles (12° 43′ N., 122° 06′ 15″ E.).	C. S. 4714; June, 1906.	Mar. 25	8.35 a. m.	73	fne. S...........
				8.51 a. m.	78	fne. S...........
D. 5179	Romblon Lt., S. 56° E., 4.50 miles (12° 38′ 15″ N., 122° 12′ 30″ E.).	.....do.....	...do....	10.41 a. m.	37	hrd. S...........
				10.49 a. m.	37	hrd. S...........
....	Romblon Harbor (rf. S. of Agbatan Pt.).	C. S. 4442; Mar., 1907.	...do....	2.00 p. m.	....	Mss. staghorn Co.
....	Romblon (anch.)...........	.....do.....	...do....	8.00 p. m.	20	....
....	Romblon (beach at Binagon and Agpatan Pts.).	.....do.....	Mar. 26	9.00 a. m.	....	S., Co...........
....	Romblon (rf. E. of Sabang Pt.).	.....do.....	...do....	9.00 a. m.	....	mrgn. Clmps. Co..
....	Romblon (rf. E. side Rosas Pt.).	.....do.....	...do....	1.00 p. m.	....	co. Clmps........
D. 5180	Romblon Lt., N. 6° 30′ E., 7.10 miles (12° 28′ 30″ N., 122° 15′ E.).	C. S. 4715; Apr., 1907.	...do....	7.32 p. m.	....	....
	Off eastern Panay.					
D. 5181	Antonia Id. (S.), S. 63° W., 6.60 miles (11° 36′ 40″ N., 123° 26′ 35″ E.).	C. S. 4417; Feb., 1905.	Mar. 27	8.39 a. m.	26	M., fne. S........
				8.46 a. m.	26	M., fne. S........
D. 5182	Antonia Id. (S.), N., 43° W., 3.70 miles (11° 30′ 40″ N., 123° 23′ 20″ E.).	.....do.....	...do....	9.43 a. m.	24	fne. S., M........
				9.51 a. m.	24	fne. S., M........
	Between Panay and Negros.					
D. 5183	Lusaran Lt., S. 29° E., 4 miles (10° 32′ 48″ N., 122° 26′ E.).	C. S. 4718; Dec., 1906.	Mar. 30	10.27 a. m	96	sft. gn. M........
				10.51 a. m.	96	sft. gn. M........
D. 5184	Lusaran Lt., N. 22° E., 11.25 miles (10° 18′ 30″ N., 122° 23′ 30″ E.).	.....do.....	...do....	1.09 p. m.	565	gn. M...........
				1.53 p. m.	565	gn. M...........
D. 5185	Lusaran Lt., N. 23° E., 25.50 miles (10° 05′ 45″ N., 122° 18′ 30″ E.).	.....do.....	...do....	4.39 p. m.	638	gn. M...........
				5.26 p. m.	638	gn. M...........
D. 5186	Lusaran Lt., N. 20° E., 37.80 miles (9° 53′ 30″ N., 122° 15′ 30″ E.).	.....do.....	...do....	8.01 p. m.	....	....
	Tanon Strait, east coast of Negros.					
D. 5187	Apo Id., S. 21° W., 12.50 miles (9° 16′ 45″ N., 123° 21′ 15″ E.).	C. S. 4718; Dec., 1906.	Mar. 31	1.06 p. m.	225	sft. gn. M........
				1.26 p. m.	225	sft. gn. M........

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures. Air.	Temperatures. Surface.	Temperatures. Bottom.	Density. Surface.	Density. Bottom.	Apparatus.	Trial. Depth.	Trial. Duration.	Drift. Direction.	Drift. Distance.	Remarks.
°F.	°F.	°F.					h. m.		mi.	
82	82				int. 4	surf	0 20	N. 7° E	1.3	Chart indicates no bottom at 70 fms.
					130′ seine	4 ft	1 30			4 hauls.
					130′ seine	10 ft	2 30			5 hauls.
80	79				int. 4	surf	0 21	S. 72° E	1.0	
80	79				int. 4 §	25 fms.	0 20 1.5	E	0.9	40 fms. dredge cable out.
80	80		1.02515	1.02516	Luc. sdr. (a)					Therm. failed to trip.
80	80				12′ Agz.; 3 m.b.	botm	0 20	N. 84° W	2.0	
81	81	75.7			Luc. sdr. (a)					
81	81				12′ Agz.; 3 m.b.	botm	0 15	N. 81° W	1.3	
					dyn	8–15 ft	3 00			
					dip; e. l	surf	2 00			
					150′ seine					Several hauls.
					dyn	10–20 ft	3 00			Few shots made.
					dyn	8–15 ft	1 30			Interrupted by rain.
79	80		1.02530		int. 4	surf	20	S. 5° E	(?)	
80	80		1.02544		Tnr.-Blish sdr. (e).					
80	80				9′ Jn. dr	botm	4	S. 46° W	.3	
81	80		1.02515		Tnr.-Blish sdr. (e).					
81	80				9′ Jn. dr	botm	8	S. 39° W	.7	Veered from 43 to 55 fms.
83	81	63.4	1.02489	1.02551	Luc. sdr. (a)					
84	81				12′ Agz.; 3 m.b.	botm	20	S. 78° W	.7	Veered from 192 to 250 fms. during haul.
90	83	49.8	1.02489	1.02505	Luc. sdr. (a)					
92	82				12′ Agz.; 3 m.b.	botm	20	S. 52° W	2.0	
81	82	49.8	1.02481	1.02492	Luc. sdr. (b)					
81	82				int. 4 §	550 fms.	20 48	S. 64° W	2.5	1,000 fms. dredge cable out.
81	80		1.02530		int. 4	surf	20	S. 4° W	.8	
87	81	53.6	1.02475	1.02492	Luc. sdr. (a)					
87	81				9′ Jn. dr	botm	11	S. 79° W	.6	Lashing slipped; catch lost.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Tanon Strait, east coast of Negros—Continued.					
			1908.		*fms.*	
....	Port Bais (anch.)...........	C. S. 4718; Dec., 1906.	Mar. 31	8.00 p. m.	9	....
D. 5188	Pescador Id., N. 16° E., 14 miles (9° 44′ N., 123° 14′ 20″ E.).	.....do......	Apr. 1	10.21 a. m. 10.44 a. m.	299 299	gn. M............ gn. M............
D. 5189	Pescador Id., N. 72° E., 3.30 miles (9° 56′ 30″ N., 123° 15′ E.).	.....do......	...do.....	1.08 p. m. 1.33 p. m	300 300	gn. M............ gn. M............
D. 5190	Pescador Id., S. 9° E., 10.70 miles (10° 08′ 15″ N., 123° 16′ 45″ E.).	.....do......	...do	4.16 p. m. 4.39 p. m.	295 295	gn. M............ gn. M............
....	Guijulugan (beach)..........	.....do......	Apr. 2	8.00 a. m.	....	S., G., grassy......
D. 5191	Refugio Id. (S.), S. 74° W., 5.50 miles (10° 29′ 45″ N., 123° 31′ 15″ E.).	.....do......	...do.....	2.58 p. m. 3.26 p. m.	258 258	gn. M............ gn. M............
....	Balamban (anch.)...........	.....do......	...do.....	8.00 p. m.	12	S.................
	Off northern Cebu Id.					
D. 5192	Jilantaguan Id. (E.), N. 13° W., 3 miles (11° 09′ 15″ N., 123° 50′ E.).	C. S. 4718; Dec., 1906.	Apr. 3	9.28 a. m. 9.40 a. m.	32 32	gn. S............. gn. S.............
D. 5193	Chocolate Id., N. 77° E., 8 miles (11° 16′ 45″ N., 123° 55′ 45″ E.).	.....do......	...do.....	11.03 a. m. 11.12 a. m.	71 71	gn. M............ gn. M............
D. 5194	Chocolate Id., N. 66° W., 8 miles (11° 15′ 30″ N., 124° 11′ E.).	.....do......	...do.....	1.58 p. m. 2.15 p. m.	148 148	gn. M............ gn. M............
D. 5195	Capitancillo Id. Lt., N., 11.75 miles (10° 47′ N., 124° 06′ 30″ E.).	.....do......	...do.....	7.03 p. m.	....	....
D. 5196	Capitancillo Lt., N. 5° 30′ W., 14.30 miles (10° 44′ 30″ N., 124° 07′ 30″ E.).	.....do......	...do.....	7.42 p. m.	....	....
....	Mactan Cove, S. E. shore (rf.).	.....do......	Apr. 6	10.00 a. m.	....	mrgn. Clmps. Co..
....	Mactan Id. (shore, opposite Cebu).	.....do......	Apr. 7	8.00 a. m.	....	honey-combed Rf.
	Vicinity western Bohol.					
....	Mantacao Id., S. side (rf.)...	C. S. 4718; Dec., 1906.	Apr. 8	3.00 p. m.	....	mrgn. Mss. Co....
....	Mantacao Id., S. side (beach).	.....do......	...do.....	3.00 p. m.	....	S.................
....	Mantacao Id. (anch.)........	.....do......	...do.....	8.00 p. m.	10	....
D. 5197	Baliscasag Id., S., 22 miles (9° 52′ 30″ N., 123° 40′ 45″ E.).	.....do......	Apr. 9	8.34 a. m. 8.55 a. m.	174 174	gn. M............ gn. M............
D. 5198	Baliscasag Id., S. 6° E., 10.25 miles (9° 40′ 50″ N., 123° 39′ 45″ E.).	.....do......	...do.....	11.05 a. m. 11.25 a. m.	220 220	gn. M............ gn. M............
....	Tagbilaran Channel (beach on Bohol side near S. anch.).	.....do......	...do.....	3.00 p. m.	....	S., grassy.........
D. 5199	Pamilacan Id. (E.), S. 61° W., 6.25 miles (9° 31′ 50″ N., 124° 40″ E.).	C. S. 4719; Aug., 1904.	...do.....	7.36 p. m.	....	....
D. 5200	Pamilacan Id. (E.). S. 66° W., 7.25 miles (9° 31′ 50″ N., 124° 02′ 05″ E.).	.....do......	...do.....	8.07 p. m.	....	....
	Sogod Bay, southern Leyte Id.					
D. 5201	Limasaua Id. (E.), S. 1° E., 14.80 miles (10° 10′ N., 125° 04′ 15″ E.).	C. S. 4719; Aug., 1904.	Apr. 10	8.24 a. m. 9.13 a. m.	554 554	gy. S., M......... gy. S., M.........
D. 5202	Limasaua Id. (E.), S. 2° E., 16.70 miles (10° 12′ N., 125° 04′ 10″ E.).	.....do......	...do.....	10.31 a. m. 11.07 a. m.	502 502	gy. M............ gy. M............
D. 5203	Limasaua Id. (S.), S. 38° W., 5.50 miles (9° 58′ N., 125° 07′ 40″ E.).	.....do......	...do.....	2.21 p. m. 3.47 p. m.	775 775	gn. M............ gn. M............

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dip; e. l.	surf.	3 30			Brackish water.
82.5	81	62.6	1.02475	1.02502	Luc. sdr. (a)					
84.5	81				12 Agz.; 3 m.b.	botm.	20	N. 63° W.	.6	
85	82	62.8	1.02468	1.02495	Luc. sdr. (a)					
89	82				12 Agz.; 3 m.b.	botm.	20	N. 70° E.	1.0	
92.5	83	63	1.02468	1.02482	Luc. sdr. (a)					
90	83				int. 4 §	250 fms.	20 20	N. 43° W.	.8	400 fms. dredge cable out.
					150′ seine	9 ft.	3 00			8 hauls.
93	83	62.8	1.02497	1.02516	Luc. sdr. (a)					
91.5	83				12′ Agz.; 3 m.b.	botm.	20	S. 88° W.	.9	
					dip; e. l.	surf.	1 30			
82	82		1.02518		Tnr.-Blish sdr. (b).					
82	82				9′ Jn. dr.	botm.	3	N. 45° W.	.2	
86	82		1.02503		Tnr.-Blish sdr. (e).					
90	82				12′ Agz.; 3 m.b.	botm.	20	N. 44° W.	1.3	
85	83	56.5	1.02447	1.02597	Luc. sdr. (a)					
84	83				12′ Agz.; 3 m.b.	botm.	20	S. 25° W.	.8	
82.5	84		1.02514		int. 4.	surf.	20	S. 22° 30′ E.	1.5	No sounding.
81.5	82		1.02518		int. 4.	surf.	20			Ship steered in circle.
					dyn.	10–20 ft.	2 00			High water.
					poison.		2 00			Tide pools.
					dyn.	10–30 ft.	2 30			
					130′ seine	5 ft.	2 30			6 hauls.
					dip; e. l.	surf.	1 00			
89	81	54.3	1.02489	1.02513	Luc. sdr. (a)					
91	81				12′ Agz.; 3 m.b.	botm.	20	N. 58° W.	1.0	
84	81	53.9	1.02434	1.02500	Luc. sdr. (a)					
					12′ Agz.; 3 m.b.	botm.	20	S. 54° W.	1.1	
					130′ seine	6 ft.	1 00			3 hauls.
83	79		1.02530		int. 4.	surf.	20	E.	.6	
82.5	79		1.02468		int. 4.	surf.	18			Ship steered in circle.
80	79	52.8	1.02440	1.02497	Luc. sdr. (a)					
85	80				12′ Agz.; 3 m.b.	botm.	20	S. 24° W.	1.5	Veered 112 fms. cable during haul.
80	80	(?)	1.02440	1.02457	Luc. sdr. (a)					Therm. failed to trip.
79	80				12′ Agz.; 3 m.b.	botm.	20	(?)	(?)	
82	80	52.9	1.02468	1.02606	Luc. sdr. (a)					
83	81				12′ Agz.; 3 m.b.	botm.	31	N. 72° W.	2.7	Veered from 1,200 to 1,330 fms. during haul.

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Off east coast of Leyte Id.		1908.		*fms.*	
D. 5204	Mariquitdaquit Id., N. 88° E., 3.50 miles (11° 04′ 18″ N., 125° 05′ 30″ E.).	C. S. 4719; Aug., 1904.	Apr. 11	9.48 a. m.	15	gn. M
....	Tacloban (anch.)	do	Apr. 12	8.00 p. m.	3	M., S
....	Tacloban (near anch.)	do	do	8.00 p. m.	....	
D. 5205	Caguayan Pt., N. 2° E., 0.70 mile (11° 19′ 30″ N., 124° 58′ 05″ E.).	do	Apr. 13	9.28 a. m.	8	
....	San Januico Strait, N. of Nabubuy Id. (rf.).[a]	do	do	1.00 p. m.	....	staghorn Co., R
	Off western Samar.					
D. 5206	Badian Id. (N.), N. 27° E., 5.75 miles (11° 31′ 40″ N., 124° 42′ 40″ E.).	C. S. 4420; May, 1907.	Apr. 14	9.54 a. m.	32	gn. M
				10.02 a. m.	32	gn. M
D. 5207	Badian Id. (N.), S. 74° E., 4.70 miles (11° 38′ 05″ N., 124° 40′ 45″ E.).	do	do	11.22 a. m.	35	gn. M., S
				11.27 a. m.	35	gn. M., S
D. 5208	Taratara Id. (N.), S. 67° 30′ E., 4.10 miles (11° 45′ 53″ N., 124° 42′ 50″ E.).	C. S. 4451; June, 1904.	do	12.53 p. m.	26	sft. gn. M
				12.59 p. m.	26	sft. gn. M
D. 5209	Taratara Id. (N.), S. 53° W., 1.80 miles (11° 45′ 25″ N., 124° 48′ 05″ E.).	do	do	2.03 p. m.	20	gn. M
				2.13 p. m.	20	gn. M
				2.13 p. m.	20	
....	Catbalogan (Pamuntangan Rf.).	do	do	4.00 p. m.	....	sft. Co., S
....	Catbalogan (near anch.)	do	do	7.00 p. m.	5	
....	Catbalogan (beach above Aguada Pt.).	do	Apr. 15	8.00 a. m.	....	S., M
....	Catbalogan (Pamuntangan Rf.).	do	do	8.00 a. m.	....	sft. Co., algæ
....	Catbalogan (Quinituay Rf.)	do	do	1.30 p. m.	....	staghorn Clmps., Co., R.
....	Catbalogan (Lutao Rf. and Anas Pt.).	do	Apr. 16	8.30 a. m.	....	Co., R
....	Catbalogan (Quinituay Rf., beach).	do	do	8.30 a. m.	....	S., Co
....	Catbalogan (Quinituay Rf.)	do	do	2.30 p. m.	....	staghorn Mss., Co., R.
D. 5210	Limbancauayan Id. (E.), N. 1° W., 3.60 miles (11° 49′ 55″ N., 124° 28′ 05″ E.).	C. S. 4420; May, 1907.	Apr. 17	10.17 a. m.	50	fne. gy. S
				10.30 a. m.	50	fne. gy. S
				10.30 a. m.	50	
	East of Masbate Id.					
D. 5211	Panalangan Pt., Talajit Id., N. 33° E., 5.25 miles (11° 51′ 35″ N., 124° 14′ E.).	C. S. 4715; Apr., 1907.	Apr. 17	1.05 p. m.	155	gn. M., S
				1.20 p. m.	155	
				1.20 p. m.	155	
....	Cataingan Bay (upper rf., inside Dumurug Pt.).	C. S. 4455; Sept., 1904.	do	4.00 p. m.	....	S., sctrd. Clmps. staghorn Co.
....	Cataingan Bay, Dumurug Pt. (beach).	do	Apr. 18	8.30 a. m.	....	
....	Cataingan Bay (upper rf., inside Dumurug Pt.).	do	do	8.30 a. m.	....	S., sctrd. Clmps. staghorn Co.
			Apr. 19	3.00 p. m.	....	S., sctrd. Clmps. staghorn Co.
....	Cataingan Bay (anch.)	do	do	8.00 p. m.	20	
D. 5212	Panalangan Pt., S. 54° 30′ E., 14.50 miles (12° 04′ 15″ N., 124° 04′ 36″ E.).	C. S. 4715; Apr., 1907.	Apr. 20	8.29 a. m.	108	gy. S., M
				8.45 a. m.	108	gy. S., M
D. 5213	Destacado Id. (S.), N. 87° E., 8.50 miles (12° 15′ N., 123° 57′ 30″ E.).	do	do	10.38 a. m.	80	S., M., Sh
				10.47 a. m.	80	S., M., Sh
....	Masbate (rf. N. of town)	do	do	3.00 p. m.	....	Co., R

[a] One boat made collections up the Silaga River for a few miles.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°*F.*	°*F.*	°*F.*					*h. m.*		*mi.*	
84	82		1.02391		12′ Agz.; 3 m.b.	botm	21	N. 57° W.	1.0	Sounding with hand lead.
					dip; e. l.	surf				
					2 gill nets					Hauled following morning.
84	83		1.02448		12′ Agz.; 3 m.b.	botm				Fouled bottom; trawl lost; mud bag only recovered; sounding with hand lead.
					dyn	3–10 ft.	3 00			Brackish water.
83	83		1.02406		Tnr.-Blish sdr. (e).					
83	83				12′ Agz.; m. b.	botm	20	N. 18° W.	.7	
86	84		1.02395		Tnr.-Blish sdr. (e).					
85	84				12′ Agz.; m. b.	botm	15	N. 16° E.	.5	
84	84		1.02483		Tnr.-Blish sdr. (e).					
84	84				12′ Agz.; m. b.	botm	20	N. 27° E.	.6	
81	84		1.02493		Tnr.-Blish sdr. (e).					
81	84				12′ Agz.; m. b.	botm	20	S. 28° E.	.6	Mud bag lost.
81	84				K2	surf	10	S. 28° E.	.3	Towed alongside.
					dyn	12–15 ft.	1 00			
					2 gill nets					Finally hauled on Apr. 17.
					130′ seine	6 ft.	3 00			
					dyn	12–15 ft.	3 00			
					dyn	4–20 ft.	3 00			
					dyn	8–30 ft.	3 00			Coral unthrifty.
					150′ seine	6 ft.				2 hauls.
					dyn	4–30 ft.	2 30			2 boats used.
82	84	76.3	1.02406	1.02523	Luc. sdr. (a).					
83	83				12′ Agz.; m. b.	botm	11	N. 1° W.	.2	
83	83				K2	surf	11	N. 1° W.	.2	Towed alongside.
83	84	56.6	1.02482	1.02509	Luc. sdr. (a).					
84	84				int. 4 §	(?)	20 10	N. 31° W.	1.7	200 fms. dredge cable out.
84	84				K2	surf	20	N. 31° W.	1.7	Towed alongside.
					dyn	6–10 ft.	1 30			
					150′ seine		2 30			5 hauls.
					dyn	6–10 ft.	3 00			
					dyn	6–10 ft.	1 00			
					dip; e. l.	surf				
82	80	59.9	1.02467	1.02476	Luc. sdr. (a).					
83	80				12′ Agz.; m. b.	botm	20	N. 21° W.	.9	Veered 8 fms. during haul.
82	81		1.02489		Tnr.-Blish sdr. (e).					
85	81				12′ Agz.; m. b.	botm	20	N. 22° W.	.8	
					dyn	6–25 ft.	2 00			

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	East of Masbate Id.—Cont'd.		1908.		*fms.*	
....	Masbate (near anch.)........	C. S. 4715; Apr., 1907.	Apr. 20	5.30 p. m. 5.30 p. m.	....	....
....	Masbate (anch.).............	.....do.....	...do....	8.00 p. m.	20	....
D. 5214	Palanog Lt., Masbate, S. 17° W., 2.60 miles (12° 25′ 18″ N., 123° 37′ 15″ E.).	.....do.....	Apr. 21	8.59 a. m. 9.19 a. m.	218 218	gn. M............ gn. M............
D. 5215	Palanog Lt., S. 5° 30′ E., 8.50 miles (12° 31′ 30″ N., 123° 35′ 24″ E.).	.....do.....	...do....	10.27 a. m. 11.32 a. m.	604 604	gn. M............ gn. M............
	Between Burias and Luzon.					
....	Port San Miguel (beach).....	C. S. 4454; May, 1906.	Apr. 21	3.00 p. m.	....	S...............
....	Port San Miguel (rf. N. of Puro Id.).	.....do.....	...do....	3.00 p. m.	....	S., mrgn. Clmps. Co.
....	Port San Miguel (anch.).....	.....do.....	...do....	7.00 p. m.	19	....
D. 5216	Anima Sola Id., N. 44° W., 29.50 miles (12° 52′ N., 123° 23′ 30″ E.).	C. S. 4715; Apr., 1907.	Apr. 22	8.19 a. m. 8.36 a. m.	215 215	gn. M............ gn. M............
D. 5217	Anima Sola Id., N. 42° W., 17.30 miles (13° 20″ N., 123° 14′ 15″ E.).	.....do.....	...do....	10.31 a. m. 10.44 a. m.	105 105	crs. gy. S......... crs. gy. S.........
D. 5218	Anima Sola Id. (E.), N. 10° W., 2 miles (13° 11′ 15″ N., 123° 02′ 45″ E.).	.....do.....	...do....	12.58 p. m. 1.05 p. m.	20 20	crs. S............ crs. S............
....	Burias Id., Port Busin (pt. below fort rf.).	C. S. 4454; May, 1906.	...do....	3.00 p. m.	....	mrgn. co. Rf......
....	Burias Id., Port Busin (anch.)	.....do.....	...do....	8.00 p. m.	12	....
....	Port Busin (pt. below fort, rf.)	.....do.....	Apr. 23	5.30 a. m.	....	mrgn. co. Rf......
....	Port Busin (beach at fort pt.)	.....do.....	...do....	5.30 a. m.	....	S., R., Co.........
	Between Marinduque and Luzon.					
D. 5219	Mompog Id. (NE.), N. 35° 30′ W., 12.25 miles (13° 21′ N., 122° 18′ 45″ E.).	C. S. 4715; Apr., 1907.	Apr. 23	1.57 p. m. 2.37 p. m.	530 530	gn. M............ gn. M............
....	Santa Cruz Harbor Marinduque (anch.).	C. S. 4453; July, 1908.	...do....	8.00 p. m.	12	S...............
....	Santa Cruz Id. (SE.)........	.....do.....	Apr. 24	6.00 a. m.	....	mrgn. Co.........
....	Santa Cruz Id. (SE.)........	.....do.....	...do....	8.30 a. m.	....	S., grassy.........
D. 5220	San Andreas Id. (W.), S. 57° W., 8.50 miles (13° 38′ N., 121° 58′ E.).	C. S. 4714; June, 1906.	...do....	12.57 p. m. 1.06 p. m.	50 50	sft. gn. M......... sft. gn. M.........
D. 5221	San Andreas Id. (W.), S. 27° E., 5.50 miles (13° 38′ 15″ N., 121° 48′ 15″ E.).	.....do.....	...do....	3.05 p. m. 3.25 p. m.	193 193	gn. M............ gn. M............
D. 5222	San Andreas Id. (W.), S. 57° E., 9.20 miles (13° 38′ 30″ N., 121° 42′ 45″ E.).	.....do.....	...do....	4.33 p. m. 4.49 p. m.	195 195	gn. M............ gn. M............
D. 5223	Malabrigo Lt., W., 9.80 miles (13° 36′ N., 121° 25′ 30″ E.).	.....do.....	...do....	7.47 p. m.	....	....
D. 5224	Malabrigo Lt., N. 79° W., 6.25 miles (13° 34′ 50″ N., 121° 21′ 45″ E.).	.....do.....	...do....	8.24 p. m.	....	....
	China Sea, south of Corregidor.					
D. 5225	Corregidor Lt., N. 10° E., 9.50 miles (14° 13′ 24″ N., 120° 32′ 36″ E.).	C. S. 4240; Feb., 1907.	May 4	7.06 p. m.	....	....
D. 5226	Corregidor Lt., N. 10° E., 10.70 miles (14° 12′ 15″ N., 120° 32′ 24″ E.).	.....do.....	...do....	7.45 p. m.	....	....

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					2 gill nets					Hauled following morning.
					2 wire traps	botm.				Lost.
					dip; e. l.	surface	1-30			
81	82	51.4	1.02475	1.02485	Luc. sdr. (a)					
81	81				12′ Agz.; m. b.	botm.	20	N. 36° E.	1.0	
82	81	50.5	1.02440	1.02441	Luc. sdr. (a)					
82	82				12′ Agz.; m. b.	botm.	20	S. 77° E.	1.2	
					150′ seine	15 ft	2 30			5 hauls.
					dyn.	6–30 ft.	2 30			
					dip; e. l.	surface	3 00			
80	80	51.9	1.02481	1.02465	Luc. sdr. (a)					
80	80				12′ Agz.; m. b.	botm.	20	N. 42° W.	1.5	
83	82	63.1	1.02489	1.02496	Luc. sdr. (a)					
85	81				12′ Agz.; m. b.	botm.	20	N. 45° W.	1.2	
86	82		1.02538		Tnr.-Blish sdr. (e).					
86	82				9′ Jn. dr.	botm.	5	N. 16° W.	.2	
					dyn.	10–30 ft.	2 00			
					dip; e. l.	surface	2 00			
					dyn.	10–30 ft.	1 30			
					150′ seine	6 ft	1 30			3 hauls.
84	86	50.8	1.02468	1.02467	Luc. sdr. (a)					
86	87				12′ Agz.; m. b.	botm.	20	N. 27° E.	1.5	
					dip; e. l.	surface	2 00			
					dyn.	6–15 ft.	1 00			
					150′ seine	4 ft				5 hauls; beach inside reef.
87	85		1.02493		Tnr.-Blish sdr. (e).					
87	85				12′ Agz.; m. b.	botm.	14	N. 54° W.	.7	
85	84	52.4	1.02503	1.02467	Luc. sdr. (a)					
85	84				12′ Agz.; m. b.	botm.	20	N. 21° W.	1.0	
85	85	52.8	1.02470	1.02447	Luc. sdr. (a)					
86	85				12′ Agz.; m. b.	botm.	20	N. 20° W.	1.7	
83	84				int. 4	surface	20	S. 69° W.	1.8	
83	84				int. 4	surface	10	N. 80° W.	.4	
85	84		1.02448		int. 4 §	40 fms.	20 (?)	S.	.9	Record incomplete.
85	83		1.02514		int. 4	surface	20	S.	.8	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	East of Mindoro.		1908.		*fms.*	
D. 5227	Pt. Origon, S. 44° E., 18.30 miles (12° 53′ 45″ N., 121° 52′ 30″ E.).	C. S. 4714; June, 1906.	May 5	1.04 p. m. 1.30 p. m.	322 322	gn. M ......
	South of Romblon.					
D. 5228	Romblon Lt., N. 3° E., 6.25 miles (12° 29′ 30″ N., 122° 15′ 45″ E.).	C. S. 4715; Apr., 1907.	May 5	7.02 p. m. 7.02 p. m.	....	....
	Between Cebu and Leyte.					
D. 5229	Talong Id. (E.), S. 17° W., 5.75 miles (10° 48′ 45″ N., 124° 21′ 15″ E.).	C. S. 4719; Aug., 1904.	May 7	9.34 a. m. 9.55 a. m.	*290 *290	....
	Between Bohol and Leyte.					
D. 5230	Limasaua Id. (S.), S. 68° E., 22.50 miles (10° 01′ 50″ N., 124° 42′ 30″ E.).	C. S. 4719; Aug., 1904.	May 7	7.03 p. m. 7.13 p. m. 7.13 p. m.	118 118 118	gy. S ....
D, 5231	Limasaua Id. (S.), S. 68° E., 21.70 miles (10° 01′ 15″ N., 124° 43′ 15″ E.).	...do...	...do...	7.48 p. m.	......	......
D. 5232	Limasaua Id. (S.), S. 69° E., 20.60 miles (10° 00′ 45″ N. 124° 44′ 06″ E.).	...do...	...do...	8.25 p. m.	......	......
D. 5233	Limasaua Id. (S.), S. 70° E., 19.50 miles (10° 00′ 22″ N., 124° 45′ 06″ E.).	...do...	...do...	9.00 p. m.	......	......
D. 5234	Limasaua Id. (S.), S. 70° 30′ E., 18.50 miles (10° N., 124° 46′ 06″ E.).	...do...	...do...	9.42 p. m.	......	......
	Pacific Ocean, east coast Mindanao.					
......	Surigao (beach near Bilan Bilan).	C. S. 4644: July, 1905.	May 8	8.30 a. m.	......	M., S., Co., grassy.
......	Surigao (rf. above Bilan Bilan).	...do...	...do...	1.30 p. m.	......	R., co. Clmps
D. 5235	Nagubat Id. (S.), S. 58° W., 7 miles (9° 43′ N., 125° 48′ 15″ E.).	C. S. 4719: Aug., 1904.	May 9	9.24 a. m. 9.30 a. m.	44 44	sft. M sft. M
......	Generale Id. (S. W. shore, beach).	...do...	...do...	3.00 p. m.	......	S., Co., grassy
......	Generale Id. (rf.)	...do...	...do...	3.00 p. m.	......	mrgn. Co.
......	Generale Id. (Capunuypugan Pt., rf.).	...do...	May 10	8.30 a. m.	......	mrgn. Co.
......	Generale Id. (rf.)	...do...	...do...	3.00 p. m.	......	......
D. 5236	Magabao Id. (S.), N. 85° W., 9.10 miles (8° 50′ 45″ N., 126° 26′ 52″ E.).	...do...	May 11	10.27 a. m. 11.02 a. m.	494 494	fne. gy. S fne. gy. S
......	Lianga Bay (rf. S. of town)	...do...	...do...	4.00 p. m.	......	co. Mss., algæ
......	Lianga Bay (anch.)	...do...	...do...	8.00 p. m.	15	......
D. 5237	Sanco Pt. Id. (N.), N. 69° W., 5.75 miles (8° 09′ 06″ N., 126° 31′ 45″ E.).	C. S. 4724; Oct., 1909.	May 12	10.11 a. m. 10.42 a. m.	249 249	...... (?) ...... gn. M
D. 5238	Pt. Lambajon, S. 65° W., 4.30 miles (7° 34′ 45″ N., 126° 38′ 15″ E.).	...do...	...do...	3.00 p. m. 3.28 p. m.	380 380	gn. M gn. M
......	Baganga Bay (rf. inside Pt. Lacud).	...do...	May 13	8.30 a. m.	......	mrgn. Co.
......	Baganga Bay (S. W. shore, beach).	...do...	...do...	8.30 a. m.	......	S.
......	Baganga Bay (W. shore, beach).	...do...	...do...	1.00 p. m.	......	S., G.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
86	86		1.02498		Luc. sdr. (a)					
85	87				Int. 4 §	290 fms.	20 18	S. 30° E.	0.6	400 fms. dredge cable out.
84	85		1.02519		Int. 4	surface.	20	S. 30° E.	.6	
84	85				K2, K5 ‡	surface.	20	S. 30° E.	.6	
86	85		1.02525		Tnr.-Blish sdr. (e).					
86	85				Int. 4; K2, K5 §		20 11	S. 17° W.	.5	225 fms. dredge cable out.
84	84	57.6	1.02477	1.02496	Luc. sdr. (a)					
84	84				Int. 4	surface.	20	S. 63° E.	.6	
84	84				K2, K5 ‡	surface.	20	S. 63° E.	.6	
85	84		1.02531		int. 4; K2, K5 §	80 fms.	20 7	S. 63° E.	.4	125 fms. dredge cable out.
83.5	84		1.02531		int. 4	surface.	20	S. 63° E.	.6	
83	84		1.02514		int. 4; K2, K5 §	100 fms.	20 9	S. 63° E.	.8	150 fms. dredge cable out.
83	84		1.02531		int. 4; K2, K5 §	15 fms.	20 2	S. 63° E.	.4	25 fms. dredge cable out.
					150′ seine	6–30 ft.	3 00			5 hauls.
					dyn	6–15 ft.	4 00			
84	86		1.02475		Tnr.-Blish sdr. (e).					
84	86				12′ Agz.; 3 m. b.	botm.	20	S. 56° E.	.6	1 bridle stop carried away.
					150′ seine	6–8 ft.	2 00			5 hauls.
					dyn	12–20 ft.	2 00			
					dyn	12–20 ft.	3 00			
					dyn	4–15 ft.	2 00			
87	85	41.2	1.02453	1.02522	Luc. sdr. (a)					
86	86				12′ Agz.; 3 m.b.	botm.	20	S. 4° E.	2.5	Bridle stops carried away; net capsized; catch saved.
					dyn	12 ft.	30			Seining party failed to find suitable beach.
					dip; e. l.	surface.	30			
85	85	46.4	1.02477	1.02482	Luc. sdr. (a)					
85	85				12′ Agz.; 3 m.b.	botm.	17	S. 3° E.	2.1	Veered at intervals from 450 to 550 fms.
91	86	43.0	1.02453	1.02459	Luc. sdr. (a)					
85	86				12′ Agz.; 3 m.b.	botm.	20	S. 15° W.	2.5	
					dyn	4–20 ft.	2 00			Roily, brackish water.
					130′ seine	10–20 ft.				7 hauls.
					250′ seine	30 ft.				3 hauls. River explored.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Pujada Bay and vicinity.					
D. 5239	Uanivan Id. (N.), N. 78° E., 2.25 miles (6° 49′ 08″ N., 126° 15′ 12″ E.).	C. S. 4646; Jan., 1905.	1908. May 14	12.44 p. m.	*fms.* 171	sft. gy. M
				1.02 p. m.	171	sft. gy. M
D. 5240	Uanivan Id. (N.), E., 2.40 miles (6° 49′ 36″ N., 126° 15′ E.).	do	do	1.33 p. m.	145	sft. gy. M
				1.49 p. m.	145	sft. gy. M
D. 5241	Uanivan Id. (N.), S. 68° E., 3 miles (6° 50′ 45″ N., 126° 14′ 38″ E.).	do	do	2.24 p. m.	215	sft. gy. M
				3.05 p. m.	215	sft. gy. M
D. 5242	Uanivan Id. (N.), S. 56° E., 4 miles (6° 51′ 53″ N., 126° 14′ 10″ E.).	do	do	3.46 p. m.	191	sft. gy. M
				4.03 p. m.	191	sft. gy. M
....	Pujada Bay (rf. S. of Tataidaga Pt.).	do	May 15	9.00 a. m.	....	S., co. Clmps.
....	Pujada Bay (beach both sides Mati.).	do	do	9.00 a. m.	....	Co., R., S
D. 5243	Uanivan Id. (N.), S. 66° E., 3.10 miles (6° 50′ 55″ N., 126° 14′ 35″ E.).	do	do	12.54 p. m.	218	gy. M
				1.12 p. m.	218	gy. M
D. 5244	Uanivan Id. (N.), S. 52° 30′ E., 4 miles (6° 52′ 05″ N., 126° 14′ 15″ E.).	do	do	1.48 p. m.	171	gy M
				2.05 p. m.	171	gy. M
D. 5245	Uanivan Id. (N.), S. 41° E., 4 miles (6° 52′ 36″ N., 126° 14′ 52″ E.).	do	do	2.47 p. m.	135	gy. M
				3.02 p. m.	135	gy. M
	Pacific Ocean, east of Mindanao.					
D. 5246	Luban Id. (N.), S. 58° W., 4.6 miles (6° 29′ 15″ N., 126° 18′ 45″ E.).	C. S. 4724; Oct., 1909.	May 15	7.10 p. m.	....	....
	Gulf of Davao.					
....	Beach east of Davao town	C. S. 4724; Oct., 1909.	May 16	9.00 a. m.	....	M., S.
D. 5247	Dumalag Id. (S.), S. 78° W., 3.8 miles (7° 02′ N., 125° 38′ 45″ E.).	do	May 18	8.47 a. m.	135	M
				9.08 a. m.	135	M
D. 5248	Lanang Pt., S. 33° W., 0.40 mile (7° 07′ 25″ N., 125° 40′ 24″ E.).	C. S. 4648; Sept., 1907.	do	10.30 a. m.	18	Co
				10.38 a. m.	18	Co
D. 5249	Lanang Pt., N. 1 mile (7° 06′ 06″ N., 125° 40′ 08″ E.).	do	do	10.57 a. m.	23	Co., S
				11.02 a. m.	23	Co., S
D. 5250	Linao Pt., N. 22° E., 1.1 miles (7° 05′ 07″ N., 125° 39′ 45″ E.).	do	do	11.20 a. m.	23	Co., S
				11.24 a. m.	23	Co., S
D. 5251	Linao Pt., N. 32° E., 1.1 miles (7° 05′ 12″ N., 125° 39′ 35″ E.).	do	do	1.07 p. m.	20	Co
				1.10 p. m.	20	Co
D. 5252	Linao Pt., N. 22° E., 1.5 miles (7° 04′ 48″ N., 125° 39′ 38″ E.).	do	do	1.22 p. m.	28	Co
				1.25 p. m.	28	Co
D. 5253	Linao Pt., N. 22° E., 1.5 miles (7° 04′ 48″ N., 125° 39′ 38″ E.).	do	do	1.34 p. m.	28	Co
				1.47 p. m.	28	Co
D. 5254	Linao Pt., N. 44° E., 0.7 mile (7° 05′ 42″ N., 125° 39′ 42″ E.).	do	do	2.22 p. m.	21	S., Co
				2.26 p. m.	21	S., Co
D. 5255	Dumalag Id. (S.), S. 65° W., 4.5 miles (7° 03′ N., 125° 39′ E.).	do	do	6.03 p. m.	100	sft. M
				6.13 p. m.	100	sft. M

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
84	86		1.02417		Tnr.-Blish sdr. (e).					
84	86				12′ Agz.; 3 m.b.	botm...	7	N. 13° W..	0.5	Bridle and tripping stops carried away; net torn; frame twisted; 1 mud bag lost.
84	86		1.02448		Tnr.-Blish sdr. (e).					
84	86				int. 4 §	115 fms.	20 7	N. 16° W..	1.1	175 fms. dredge cable out.
85	85		1.02453		Tnr.-Blish sdr. (e).					
84	85				9′ alb. Blk.; m. b.	botm...	20	N. 15° W..	1.1	Veered from 506 to 540 fms.
84	85	64.1	1.02457	1.02489	Luc. sdr. (a)					
83.5	85				9′ alb. Blk.; m. b.	botm...	20	N. 13° W..	1.0	
					dyn.	6–20 ft..	2 30			
					150′ seine	10 ft	2 00			5 hauls.
84	84	63.6	1.02453	1.02468	Luc. sdr. (a)					
85	85				12′ Agz.; m. b.	botm...	20	N. 15° W..	1.1	
84	85		1.02497		Tnr.-Blish sdr. (e).					
84	85				12′ Agz.; m. b.	botm...	20	N. 46° E...	.7	
84	84		1.02468		Tnr.-Blish sdr. (e).					
84	84				12′ Agz.; m. b.	botm...	20	N. 2° W...	.8	Net damaged.
83	82		1.02477		int. 4 §	100 fms.	20 8	S. 6° E....	1.8	150 fms. dredge cable out.
					150′ seine	6 ft	2 00			3 hauls.
80	83		1.02417		Tnr.-Blish sdr. (e).					
81	83				12′ Agz.; m. b.	botm...	20	N. 76° W..	.5	
84.5	83		1.02453		Tnr.-Blish sdr. (e).					
84.5	83				6′ Jn. dr.	botm...	4	(?)	(?)	Veered from 27 to 30 fms.
85	84		1.02453		Tnr.-Blish sdr. (e).					
85	84				6′ Jn. dr.	botm...	7	(?)	(?)	Veered from 30 to 36 fms.
84	84		1.02457		Tnr.-Blish sdr. (e).					
84	84				6′ Jn. dr.	botm...	3	(?)	(?)	
86	83		1.02433		Tnr.-Blish sdr. (e).					
86	83				6′ Jn. dr.	botm...	5	(?)	(?)	
85	83		1.02417		Tnr.-Blish sdr. (e).					
85	83				6′ Jn. dr.	botm...	4	S. 29° E...	.2	
83	84		1.02433		Tnr.-Blish sdr. (e).					
83	84				6′ Jn. dr.	botm...	11	N. 11° E..	1.0	
83	83		1.02417		Tnr.-Blish sdr. (e).					
83	83				6′ Jn. dr.	botm...	5	N.	.3	
83	84		1.02227		Tnr.-Blish sdr. (e).					
83	84				12′ Agz.; m. b.	botm...	20	(?)	(?)	Made after dark.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date	Time of day.	Depth.	Character of bottom.
	Southern Mindanao, eastern Illana Bay.					
			1908.		*fms.*	
....	Cotabato (beach outside Panalisan Pt.).[a]	C. S. 4723; Oct.,1905.	May 20	2.30 p. m.	....	S., M.
....	Cotabato (near anch. outside Panalisan Pt.).	.....do......	...do.....	7.00 p. m.	30	S.
....	Malabang (beach below river).[b]	.....do......	May 21	8.30 a. m.	....	S.
....	Malabang (river)	.....do......	...do.....	3.00 p. m.	....	S.
....	Malabang (anch.)	.....do......	...do.....	8.00 p. m.	13	
D. 5256	Utara Pt., Bongo Id., N. 76° W., 2.80 miles (7° 21′ 45″ N., 124° 07′ 15″ E.)	C. S. 4619; Apr.,1907.	May 22	9.39 a. m.	158	M.
				9.54 a. m.	158	M.
D. 5257	Utara Pt., Bongo Id., N. 88° W., 7.70 miles (7° 22′ 12″ N., 124° 12′ 15″ E.).	.....do......	...do.....	10.07 a. m.	28	M.
				10.11 a. m.	28	M.
....	Polloc (Marigabato Pt., rf.)	.....do......	...do.....	1.00 p. m.	....	S., sctrd. Co.
....	Parang (Lalayanga Pt., rf.)	.....do......	May 23	8.30 a. m.	....	sctrd. Co., co. R.
....	Parang (beach in front of village).	C. S. 4723; Oct.,1905.	...do.....	8.30 a. m.	....	S.
	Vicinity of Zamboanga.					
....	Zamboanga (W. end Little Sta. Cruz Id., rf.).	C. S. 4723; Oct.,1905.	May 26	10.10 a. m.	....	sft. Co., co. heads.
....	Zamboanga (Little Sta. Cruz Id., rf.).	.....do......	May 28	7.00 a. m.	....	sft. Co., mrgn. Rfs.
	Iloilo.					
....	E. of mouth of Iloilo River (beach).	....	June 2	9.00 a. m.	....	S.
	Off southern Panay.					
D. 5258	Juraojurao Id. (S.), S. 75° W., 16.25 miles (10° 27′ 45″ N., 122° 12′ 30″ E.).	C. S. 4717; Feb.,1903.	June 2	7.08 p. m.	....	
	Off northwestern Panay.					
D. 5259	Caluya Id. (S.), S. 73° W., 12 miles (11° 57′ 30″ N., 121° 42′ 15″ E.).	C. S. 4714; June,1906.	June 3	10.06 a. m.	312	gy. M., Glob.
				10.31 a. m.	312	gy. M., Glob.
	Off southeastern Mindoro.					
D. 5260	Balanja Pt., N. 28° W., 7.20 miles (12° 25′ 35″ N., 121° 31′ 35″ E.).	C. S. 4311; July,1904.	June 3	3.14 p. m.	234	gn. M., S.
				3.32 p. m.	234	gn. M., S.
....	Mansalay (anch.)	.....do......	...do.....	9.00 p. m.	9	
....	Balanja Pt. (rf.)	.....do......	June 4	7.30 a. m.	....	mrgn. Co.
....	Mansalay Bay (W. shore, beach).	.....do......	...do.....	7.30 a. m.	....	S., Co.
....	Mansalay Bay (NE. shore, rf.).	.....do......	...do.....	1.00 p. m.	....	sctrd. Co.
H. 4912	Balanja Pt., N. 73° W., 3.70 miles (12° 30′ 55″ N., 121° 31′ 50″ E.).	.....do......	...do.....	5.34 p. m.	56	bl. M., S.
D. 5261	Balanja Pt., N. 80° W., 6 miles (12° 30′ 55″ N., 121° 34′ 24″ E.).	.....do......	...do.....	6.00 p. m.	145	S., M.
				6.11 p. m.	145	S., M.
	Off eastern Mindoro.					
D. 5262	Pt. Origon, N. 83° E., 28.50 miles (12° 37′ 30″ N., 121° 37′ 30″ E.).	C. S. 4714; June, 1906.	June 4	7.39 p. m.	....	
			....	7.45 p. m.	....	

[a] On May 20 collecting party went up Mindanao River to Cotabato; visited market.
[b] May 22 to 24 shore party made collections at Lake Lanao; visited market at Vicar.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					130′ seine	6 ft	3 00			7 hauls.
					2 gill nets					Set over night.
					150′ seine	20 ft	3 00			5 hauls.
					130′ seine	5 ft				3 hauls.
					dip; e. l.	surf.	1 30			
83	86		1.02262		Tnr.-Blish sdr. (e).					
83	86				12′ Agz.; m. b.	botm.	20	N. 49° E.	0.6	
83	86		1.02277		Tnr.-Blish sdr. (e).					
83	86				12′ Agz.; m. b.	botm.	20	S. 66° E.	.6	
					dyn.	4–25 ft.	3 00			
					dyn.	6–25 ft.	3 00			
					150′ seine	20 ft	3 00			8 hauls.
					dyn.	12 ft	1 30			
					dyn.	5–30 ft.	4 00			
					150′ seine	5 ft	2 00			5 hauls.
84	84		1.02587		int. 5	surface.	20	S. 67° 30′ W.	.3	
84.5	85	49.3	1.02489	1.02484	Luc. sdr. (a)					
84	85				12′ Agz.; m. b.	botm.	20	N. 6° W.	1.0	
85	85	51.4	1.02484	1.02484	Luc. sdr. (a)					
85	83				12′ Agz.; m. b.	botm.	20	N. 14° W.	2.2	
					dip; e. l.	surf.	1 00			
					dyn.	8–15 ft.	4 00			
					150′ seine	5–10 ft.	3 00			5 hauls; many stinging medusæ.
					dyn.	5–15 ft.	2 00			
			1.02463		Tnr.-Blish sdr. (e).					
85	84		1.02448		Tnr.-Blish sdr. (e).					
85	83				12′ Agz.; m. b.	botm.	20	N. 29° E.	.4	
85	83		1.02448		int. 5	surface.	20	N.	.5	
85	83				K2, K5‡	surface.	15	N.	.4	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Off eastern Mindoro—Cont'd.		1908.		*fms.*	
D. 5263	Pt. Origon, N. 85° E., 28.3 miles (12° 38′ 30″ N., 121° 37′ 30″ E.).	C. S. 4714; June, 1906.	June 4	8.17 p. m.	....	....
....	Naujan River (anch.)[a]	.....do.....	June 5	8.00 p. m.	17	S.................
	Verde Id. Passage and Batangas Bay.[b]					
D. 5264	Malabrigo Lt., N. 86° 30′ E., 7.30 miles (13° 35′ 30″ N., 121° 08′ E.).	C. S. 4240; Feb., 1907.	June 6	8.19 a. m.	181	S., P..............
				8.38 a. m.	181	S., P..............
D. 5265	Matocot Pt., Luzon, S. 17° E., 3.30 miles (13° 41′ 15″ N., 120° 00′ 50″ E.).	.....do.....	...do....	10.49 a. m.	135	S., M.............
				11.09 a. m.	135	S., M.............
D. 5266	Matocot Pt., S. 22° E., 7 miles (13° 44′ 36″ N., 120° 59′ 15″ E.).	C. S., 4240; Feb., 1907.	June 8	9.08 a. m.	100	M.................
				9.18 a. m.	100	M.................
D. 5267	Matocot Pt., S., 39° E., 5.50 miles (13° 42′ 20″ N., 120° 58′ 25″ E.).	.....do.....	...do....	10.08 a. m.	170	P., S., Sh.........
				10.25 a. m.	170	P., S., Sh.........
D. 5268	Matocot Pt., S., 50° E., 5.80 miles (13° 42′ N., 120° 57′ 15″ E.).	.....do.....	...do....	10.59 a. m.	170	S., P..............
				11.14 a. m.	170	S., P..............
D. 5269	Matocot Pt., S., 54° E., 3 miles (13° 39′ 50″ N., 120° 59′ 30″ E.).	.....do.....	...do....	1.08 p. m.	220	fne. S., P..........
				1.34 p. m.	220	fne. S., P..........
D. 5270	Escarceo Lt., S. 9° E., 4.25 miles (13° 35′ 45″ N., 120° 58′ 30″ E)	.....do.....	...do....	3.07 p. m.	235	gy. S., blk. Sp.....
				3.27 p. m.	235	....
....	Port Galera (anch.)..........	.....do.....	...do....	8.30 p. m.	13	....
....	Port Galera (Paniquian Id., beach).	.....do.....	June 9	8 30 a. m.	....	S., Co.............
....	Port Galera (Medio Id., rf.)...	.....do.....	...do....	8.30 a. m.	....	mrgn. Clmps. Co..
	Manila Bay.					
....	Cavite (anch.)...............	C. S. 4240; Feb., 1907.	June 9	8.00 p. m.	4	....
....	Bacoor (beach)...............	.....do.....	June 15	10.00 a. m.	....	S..................
	China Sea, vicinity southern Luzon.					
....	Jamelo Cove (rf.)............	C. S. 4240; Feb., 1907.	July 13	8.00 a. m.	....	Co. unthrifty and sparse.
....	Jamelo Cove (beach)..........	.....do.....	...do ...	8.00 a. m.	....	S..................
....	Jamelo Cove (E. side), (rf.)..	.....do.....	...do ...	2.00 p. m.	....	Co. unthrifty and sparse.
....	Jamelo Cove (beach)..........	.....do.....	...do....	2.00 p. m.	....	S..................
D. 5271	Corregidor Lt., N. 17° E., 20.70 miles (14° 03′ N., 120° 27′ 45″ E.).	.....do.....	July 14	8.08 a. m.	56	S..................
				8.30 a. m.	56	S..................
D. 5272	Corregidor Lt., N. 26° E., 25.50 miles (14° N., 120° 22′ 30″ E.).	.....do.....	...do....	9.32 a. m.	118	M., Sh., co. S.....
				10.05 a. m.	118	M., Sh., co. S.....
D. 5273	Corregidor Lt., N. 27° E., 27.25 miles (13° 58′ 45″ N., 120° 21′ 35″ E.).	.....do.....	...do....	10.34 a. m.	114	M., Sh., co. S.....
				10.47 a. m.	114	M., Sh., co. S.....
....	Tilig Bay (beach inside village).	.....do.....	...do....	2.30 p. m.	....	S., M.............

[a] On June 5 a shore party went about 4 miles up the Naujan River in boats.
[b] On June 7 a collecting trip was made up the Batangas River for about 2 miles; several hauls with a 15-foot seine.

Steamer Albatross in the Philippine Islands, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
4	83				int. 5; K2, K5§.	65 fms.	20 5	N.	0.5	
					dip.; e. l.	surface.	1-30			
84	84		1.02453		Tnr.-Blish sdr. (e).					
84	84				12′ Agz.; m. b.	botm.	4	S. 37° E.	.5	Cable parted while heaving in; trawl lost with 20 fms. cable.
87	85		1.02489		Tnr.-Blish sdr. (e).					
89	85				12′ Agz.; m. b.	botm.	20	N. 46° W.	1.0	
83	84		1.02448		Tnr.-Blish sdr. (e).					
84	85				12′ Agz.; m. b.	botm.	20	N. 86° W.	1.1	
85	85		1.02448		Tnr.-Blish sdr. (e).					
85	85				12′ Agz.; m. b.	botm.	20	S. 65° W.	1.3	
83	85		1.02433		Tnr.-Blish sdr. (e).					
85	85				12′ Agz.; m. b.	botm.	20	N. 3° W.	1.0	
84	85		1.02417	1.02509	Tnr.-Blish sdr. (e).					Therm. failed to register.
85	85				12′ Agz.; m. b.	botm.	20	N. 18° E.	1.5	
85	84		1.02448		Tnr.-Blish sdr. (e).					Water bottle failed to work.
80.5	83				int. 5; K2, K5§.	140 fms.	20 8	N. 1° W.	1.1	200 fms. dredge cable out.
					dip; e. l.	surface.	45			
					150′ seine.	7 ft	2 00			5 hauls.
					dyn.	8-20 ft.	4 00			
					dip; e. l.	surface.	1 00			
					45′ seine.	4 ft				8 hauls.
					dyn.	8-15 ft.	3 00			4 shots.
					150′ seine.	10 ft	3 00			7 hauls.
					dyn.	8-15 ft.	3 00			
					150′ seine.	6 ft	4 00			3 hauls.
83	85		1.02552		Tnr.-Blish sdr. (e).					First attempt at sounding resulted in loss of all apparatus used.
83	85				12′ Agz.	botm.	20	S.	.7	
83	84	57.4	1.02453		Tnr.-Blish sdr. (e).					
83	84				12′ Agz.	botm.	26	S. 37° E.	.3	
83	84				Tnr.-Blish sdr. (e).					
83	84				12′ Agz.	botm.	30	N. 8° E.	1.7	
					130′ seine.	8 ft	2 30			4 hauls.

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	China Sea, vicinity southern Luzon—Continued.		1908.		*fms.*	
....	Tilig Bay (rf. outside village).	C. S. 4240; Feb., 1907.	July 14	3.00 p. m.	....	mrgn. rf.
....	Tilig Bay (anch.)	do	do	8.30 p. m.	....	....
....	Tilig Bay (rf.)	do	July 15	9.00 p. m.	....	dense co. growth.
....	do	do	do	1.15 p. m.	....	mrgn. Co.
D. 5274	Malavatuan Id. (N.), S. 73° 30′ E., 17.50 miles (13° 57′ 30″ N., 120° 03′ 25″ E.).	do	July 16	9.18 a. m. 9.59 a. m.	525 525	gy. M., S. gy. M., S.
D. 5275	Malavatuan Id. (N.), S. 71° E., 10.75 miles (13° 55′ 55″ N., 120° 10′ 15″ E.).	do	do	12.51 p. m. 1.05 p. m.	117 117	fne. S. fne. S.
H. 4913	Malavatuan Id. (N.), S. 67° E., 9.30 miles (13° 56′ N., 120° 11′ 40″ E.).	do	do	1.28 p. m.	117	S., Sh., P.
....	Balikias Bay (rf.)	do	July 17	5.30 a. m.	....	mrgn. Rf.
D. 5276	Malavatuan Id. (NW.), N. 61° 30′ E., 6.50 miles (13° 49′ 15″ N., 120° 14′ 45″ E.).	do	do	8.44 a. m. 8.51 a. m.	18 18	Sh., P., S. Sh., P., S.
D. 5277	Malavatuan Id. (N.), S. 56° E., 8 miles (13° 56′ 55″ N., 120° 13′ 45″ E.).	do	do	10.02 a. m. 10.19 a. m.	80 80	fne. S. fne. S.
D. 5278	Malavatuan Id. (N.), S. 23° E., 8.50 miles (14° 00′ 10″ N., 120° 17′ 15″ E.).	do	do	11.34 a. m. 11.53 a. m.	102 102	fne. S., M., Sh. fne. S., M., Sh.
D. 5279	Malavatuan Id. (W.), S. 18° W., 5.40 miles (13° 57′ 30″ N., 120° 22′ 15″ E.).	do	do	1.13 p. m. 1.26 p. m.	117 117	gn. M. gn. M.
D. 5280	Malavatuan Id. (N.), S. 60° W., 6.10 miles (13° 55′ 20″ N., 120° 25′ 55″ E.).	do	do	2.42 p. m. 3.05 p. m.	193 193	gy. S. gy. S.
D. 5281	Malavatuan Id. (N.), S. 84° W., 4.30 miles (13° 52′ 45″ N., 120° 25′ E.).	do	July 18	10.17 a. m. 10.40 a. m.	201 201	dk. gy. S. dk. gy. S.
D. 5282	Malavatuan Id. (N.), S. 84° W., 6.20 miles (13° 53′ N., 120° 26′ 45″ E.).	do	do	11.21 a. m. 11.44 a. m.	248 248	dk. gy. S. dk. gy. S.
D. 5283	Malavatuan Id. (N.), N. 64° W., 8.75 miles (13° 48′ 30″ N., 120° 28′ 40″ E.).	do	do	1.06 p. m. 1.36 p. m.	280 280	dk. gy. S. dk. gy. S.
....	Looc Bay (anch.)	do	do	8.45 p. m.	....	....
D. 5284	Malavatuan Id. (S.), N. 46° W., 14.25 miles (13° 42′ 05″ N., 120° 30′ 45″ E.).	do	July 20	8.07 a. m. 8.45 a. m.	422 422	gy. M., Glob. gy. M., Glob.
D. 5285	Malavatuan Id. (S.), N. 45° W., 17.50 miles (13° 39′ 36″ N., 120° 32′ 55″ E.).	do	do	10.05 a. m. 10.33 a. m.	272 272	sft. M. sft. M.
H. 4914	Malavatuan Id. (S.), N. 42° W., 18.70 miles (13° 38′ 05″ N., 120° 33′ E.).	do	do	11.35 a. m.	464	gy. M., S.
D. 5286	Malavatuan Id. (S.), N. 45° W., 19.50 miles (13° 38′ 15″ N., 120° 34′ 20″ E.).	do	do	12.31 p. m. 1.09 p. m.	450 450	gy. S., M. gy. S., M.
D. 5287	Sombrero Id., N. 68° E., 11.25 miles (13° 37′ 40″ N., 120° 39′ E.).	do	do	2.30 p. m. 2.58 p. m.	379 379	gy. S. gy. S.
....	Port Maricaban (anch.)	do	do	8.15 p. m.	....	....
....	do	do	do	9.00 p. m.	....	....
....	Port Maricaban (rf.)	do	July 21	6.00 a. m.	....	staghorn Clmps., S.
D. 5288	Matocot Pt., Luzon, S. 20° E., 5.70 miles (13° 43′ 30″ N., 121° E.).	do	July 22	8.14 a. m.	*140	S., M.*
D. 5289	Matocot Pt., S. 42° E., 5 miles (13° 41′ 50″ N., 120° 58′ 30″ E.).	do	do	9.03 a. m. 9.25 a. m.	172 172	brk. Sh., S. brk. Sh., S.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dyn.	15 ft	3 00			6 shots.
					dip; e. l.	surface.	1 00			
					dyn.	12-20 ft.	2 00			2 shots.
					dyn.	15 ft	4 15			10 shots.
82	83	41.3	1.02497	1.02577	Luc. sdr. (a)					
82	83				12′ Agz.	botm.	30	N. 63° E.	1.7	
82	83		1.02453		Tnr.-Blish sdr. (e).					
82	84				12′ Agz.	botm.	20	N. 84° E.	1.5	
					Tnr.-Blish sdr. (e).					Terminal sounding of D. 5275.
					dyn.	6-12 ft.	2 00			7 shots.
80	82				Tnr.-Blish sdr. (e).					
80	82				12′ Agz.; m. b.	botm.	15	N. 22° W.	.7	Net badly torn.
82.5	83	58.6	1.02442		Tnr.-Blish sdr. (e).					
81	83				12′ Agz.; m. b.	botm.	20	S. 70° E.	1.2	
82	82	59.6	1.02457		Tnr.-Blish sdr. (e).					
83	82				12′ Agz.; m. b.	botm.	4	S. 80° E.	.6	Belly of net carried away by weight of mud when hoisted from water.
83	84		1.02452		Tnr.-Blish sdr. (e).					
83	83				12′ Agz.; m. b.	botm.	9	N. 60° E.	.8	Net torn; 1 bridle stop carried away
81	83	49.6	1.02422	1.02517	Luc. sdr. (a).					
81	83				12′ Agz.; m. b.	botm.	18	N. 38° E.	.6	
81.5	84	50.4	1.02402	1.02538	Luc. sdr. (a).					
82	83				12′ Agz.; m. b.	botm.	20	N. 86° E.	1.3	
82	83	47.4	1.02437	1.02517	Luc. sdr. (a).					
82	83				12′ Agz.; m. b.	botm.	20	N. 85° E.	.7	
79	83	46.8	1.02417	1.02517	Luc. sdr. (a).					
80	83				12′ Agz.; m. b.	botm.	24	S. 83° E.	1.7	
					dip; e. l.	surface.	2 15			
83	84	42.3	1.02437	1.02566	Luc. sdr. (a).					
84	84				12′ Agz.; m. b.	botm.	25	S. 24° E.	1.1	
85	84	46.5	1.02497	1.02421	Luc. sdr. (a).					Sounding cup lost.
84	84				12′ Agz.; m. b.	botm.	30	S. 21° E.	1.7	
84	84	46.5	1.02473		Luc. sdr. (a).					
84.5	84	42.5	1.02503	1.02556	Luc. sdr. (a).					
85	85				12′ Agz.; m. b.	botm.	20	N. 78° E.	1.8	Net wrecked.
84	85	43.4	1.02433	1.02521	Luc. sdr. (a).					
84	84				int. 5 §	310 fms.	20 24	S. 73° E.	2.2	550 fms. dredge cable out.
					dip.; e. l.	surface.	2 45			
					K2; K5.	surface.	15			Towed from row boat.
					dyn.	12-20 ft.	4 00			9 shots.
82	83		1.02477		int. 5 §	115 fms.	19 8	N 76° W	.7	200 fms. dredge cable out.
82	83		1.02497	1.02359	Tnr.-Blish sdr. (e).					
82	84				12′ Agz.; m. b.	botm.	20	S. 52° E.	1.0	

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	China Sea, vicinity southern Luzon—Continued.					
			1908.		*fms.*	
D.5290	Matocot Pt., S. 50° E., 3.10 miles (13° 40′ 09″ N., 120° 59′ 30″ E.).	C. S. 4240; Feb., 1907.	July 22	10.54 a. m.	*214	Lav., G
....	Verde Id., San Augustine Vill. (rf.).	.....do.....	...do....	1.00 p. m.	....	sctrd. Clmps. Co. on sloping bottom.
....	Verde Id. (E. side) (rf.)	.....do.....	...do....	4.00 p. m.	....	dead Co.; S
....	Varadero Bay (anch.)	.....do.....	...do....	8.00 p. m.	....	....
....	Varadero Bay (N. side) (rf.).	.....do.....	July 23	6.00 a. m.	....	sctrd. Clmps., sft. Co.
....	Varadero Bay (beach)	.....do.....	...do....	8.15 a. m.	....	S., grassy
D.5291	Escarceo Lt., N. 39° W., 2.20 miles (13° 29′ 40″ N., 121° 00′ 45″ E.).	.....do.....	...do....	1.27 p. m.	173	fne. bk. S
				1.45 p. m.	173	fne. bk. S
D.5292	Escarceo Lt., N. 30° W., 3.25 miles (13° 28′ 45″ N., 121° 01′ 12″ E.).	.....do.....	...do....	2.23 p. m.	162	fne. bk. S
				2.37 p. m.	162	fne. bk. S
D.5293	Escarceo Lt., N. 59° W., 6 miles (13° 28′ 15″ N., 121° 04′ 30″ E.).	.....do.....	...do....	3.42 p. m.	180	fne. bk. S
				3.59 p. m.	180	fne. bk. S
....	Varadero Bay (fresh-water stream).	.....do.....	July 24	6.00 a. m.	....	M
D.5294	Escarceo Lt., S. 71° W., 2.75 miles (13° 32′ 15″ N., 121° 02′ E.).	.....do.....	...do....	8.54 a. m.	244	S., P
				9.13 a. m.	244	S., P
D.5295	Escarceo Lt., S 20° W., 2 miles (13° 33′ 15″ N., 121° E.).	.....do.....	...do....	10.06 a. m.	231	gy. S
				10.26 a. m.	231	gy. S
D.5296	Matocot Pt., S. 63° E., 4.50 miles (13° 40′ 09″ N., 120° 57′ 45″ E.).	.....do.....	...do....	12.47 p. m.	*210	M., S.*
D.5297	Matocot Pt., S. 50° E., 5.10 miles (13° 41′ 20″ N., 120° 58′ E.).	.....do.....	...do....	1.55 p. m.	*198	M., S.*
D.5298	Matocot Pt., S. 38° E., 6.70 miles (13° 43′ 25″ N., 120° 57′ 40″ E.).	.....do.....	...do....	3.09 p. m.	*140	S.*
D.5299	(20° 05′ N., 116° 05′ E.)	H. O. 798; June, 1885.	Aug. 8	8.10 a. m.	524	....
				8.53 a. m.	524	gy. M., S
D.5300	(20° 31′ N., 115° 49′ E.)	.....do.....	...do....	2.07 p. m.	265	gy. M., S
				2.29 p. m.	265	gy. M., S
	China Sea, vicinity Hongkong.					
D.5301	(20° 37′ N., 115° 43′ E.)	H. O. 798; June, 1885.	Aug. 8	5.06 p. m.	208	gy. M., S
				5.29 p. m.	208	gy. M., S.
D.5302	(21° 42′ N., 114° 50′ E.)	.....do.....	Aug. 9	6.43 a. m.	38	sft. gy. M
				6.51 a. m.	38	sft. gy. M
D.5303	(21° 44′ N., 114° 48′ E.)	.....do.....	...do....	8.21 a. m.	34	bl. M
				8.27 a. m.	34	bl. M
D.5304	(21° 46′ N., 114° 47′ E.)	.....do.....	...do....	9.06 a. m.	*34	bl. M
D.5305	(21° 54′ N., 114° 46′ E.)	.....do.....	Oct. 24	8.07 p. m.	*37	sft. gy. M
....	Pratas Id. (SW. side, beach)	.....do.....	Oct. 25	3.00 p. m.	....	S., Co., grass
....	Pratas Id. (SW. side, rf.)	.....do.....	...do....	3.00 p. m.	....	sctrd. Clmps. Co., S.
D.5306	(20° 55′ N., 116° 40′ E.)	.....do.....	Oct. 26	8.09 a. m.	170	Co., S
				8.35 a. m.	170	Co., S
D.5307	(21° 08′ N., 116° 45′ E.)	.....do.....	...do....	10.39 a. m.	186	Glob
				11.04 a. m.	186	Glob
D.5308	(21° 54′ N., 115° 42′ E.)	.....do.....	Nov. 4	6.35 a. m.	62	S., M
				6.43 a. m.	62	S., M
D.5309	(21° 53′ N., 115° 51′ E.)	.....do.....	...do....	8.20 a. m.	62	gn. M
				8.32 a. m.	62	gn. M
				8.32 a. m.	62	....
D.5310	(21° 33′ N., 116° 13′ E.)	.....do.....	...do....	12.36 p. m.	100	S., Sh
				12.51 p. m.	100	S., Sh
D.5311	(21° 33′ N., 116° 15′ E.)	.....do.....	...do....	1.52 p. m.	88	crs. S., Sh
				1.39 p. m.	88	crs. S., Sh

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
84	84		1.02482	1.02354	12′ Agz.; m. b.	botm.	20	S. 36° E.	1.3	Sounding failed on account of too light lead. Net slightly torn.
					dyn.	12–25 ft.	1 30			4 shots.
					dyn.	12–25 ft.	1 00			Do.
					dip.; e. l.	surface.	6 00			
					dyn.	6–15 ft.	4 00			8 shots.
					150′ seine.	8 ft	3 00			7 hauls.
86	84	51.5	1.02462	1.02468	Luc. sdr. (a).					
85	84				12′ Agz.; m. b.	botm.	20	S. 28° E.	1.0	
83	84	52.4	1.02473	1.02421	Luc. sdr. (a).					
83	84				12′ Agz.; m. b.	botm.	20	S. 13° E.	.9	
84	84	57.4	1.02457	1.02510	Luc. sdr. (a).					
84.5	84				12′ Agz.; m. b.	botm.	30	W.	.8	
					20′ seine.	3 ft				6 hauls.
82	83	48.4	1.02580	1.02482	Luc. sdr. (a).					
83	83				12′ Agz.; m. b.	botm.	17	N. 86° W.	.6	Mud bag torn.
83	84	51.3	1.02457	1.02513	Luc. sdr. (a).					
83	84				12′ Agz.; m. b.	botm.	20	N. 59° W.	1.2	
84	84		1.02473		12′ Agz.; m. b.	botm.	20	S. 63° E.	1.2	
85	85		1.02477		12′ Agz.; m. b.	botm.	20	S. 69° E.	1.0	
83	84				12′ Agz.; m. b.	botm.	10	S. 31° E.	.5	Do.
85.5	83	42.5	1.02396	1.02538	Luc. sdr. (a).					
83.5	84				12′ Agz.; m. b.	botm.	22			Ship steered circular course.
86	85		1.02350	1.02430	Luc. sdr. (a).					Therm. failed to trip.
87	85				12′ Agz.; m. b.	botm.	20			
85	84	50.5	1.02433	1.02456	Luc. sdr. (a).					
85	84				12′ Agz.; m. b.	botm.	20			
84	83	72.1	1.02288		Tnr.-Blish sdr. (e).					
84	83				12′ Agz.; m. b.	botm.	15			
85	84	71.6	1.01960	1.02386	Tnr.-Blish sdr. (e).					
84	84				12′ Agz.; m. b.	botm.	20			
85.5	84				12′ Agz.	botm.	20			
79	78				12′ Tnr.	botm.	20			
					130′ seine.	15 ft	2 00			3 hauls.
					dyn.	10–25 ft.	2 00			3 shots.
80	80	51.4		1.02489	Luc. sdr. (a).					
79.5	80				12′ Tnr.	botm.	20			
80	80	51.6	1.02434	1.02510	Luc. sdr. (a).					
80.5	80				12′ Tnr.	botm.	20			
77	77		1.02461		Tnr.-Blish sdr. (e).					
77	78				12′ Tnr.	botm.	15			
78	79	73.3			Tnr.-Blish sdr. (e).					
79	79				12′ Tnr.	botm.	20			
79	79				K2	surface.	20			Towed from horse block.
80	80	65.5			Tnr.-Blish sdr. (e).					
80	80				12′ Tnr.	botm.	20			
81	80				Tnr.-Blish sdr. (e).					
81	80				12′ Tnr.; m. b.	botm.	20			

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	China Sea, vicinity Hongkong—Continued.					
			1908.		*fms.*	
D. 5312	(21° 30′ N., 116° 32′ E.)	H. O. 798; June, 1885.	Nov. 4	4.05 p. m.	140	S., sml. Sh.
				4.27 p. m.	140	S., sml. Sh.
D. 5313	(21° 30′ N., 116° 43′ E.)	do	do	6.20 p. m.	150	S.
				6.45 p. m.	150	S.
D. 5314	(21° 41′ N., 116° 46′ E.)	do	Nov. 5	6.05 a. m.	122	S., brk. Sh.
				6.25 a. m.	122	S., brk. Sh.
				6.25 a. m.	122	S., brk. Sh.
	China Sea, vicinity Formosa.					
D. 5315	(21° 40′ N., 116° 58′ E.)	H. O. 798; June, 1885.	Nov. 5	8.21 a. m.	148	S., Sh.
				8.42 a. m.	148	S., Sh.
D. 5316	(21° 39′ N., 117° 07′ E.)	do	do	10.37 a. m.	159	S., Sh
				10.57 a. m.	159	S., Sh.
D. 5517	(21° 36′ N., 117° 27′ E.)	do	do	2.05 p. m.	230	S., sml. Sh.
				2.31 p. m.	230	S., sml. Sh.
D. 5318	(21° 32′ N., 117° 46′ E.)	do	do	5.03 p. m.	340	S., br. C.
				5.32 p. m.	340	S., br. C.
D. 5319	(21° 31′ N., 117° 53′ E.)	do	do	7.23 p. m.		
H. 4915	(21° 23′ N., 118° 30′ E.)	do	Nov. 6	12.11 a. m.	(?)689	
H. 4916	(21° 14′ N., 119° 02′ E.)	do	do	4.32 a. m.	1,498	
H. 4917	(21° 06′ N., 119° 38′ E.)	do	do	10.15 a. m.	1,758	sft. br. M.
D. 5320	(20° 58′ N., 120° 03′ E.)	do	do	2.25 p. m.	1,804	gy. M.
				3.18 p. m.	1,804	
H. 4918	(20° 46′ N., 120° 52′ E.)	do	do	9.32 p. m.	1,220	sft. M.
	Santo Domingo, Batan Id. (rf.).	C. S. 4710; July, 1905.	Nov. 7	8.00 a. m.		Co., Lav
	Sabtan Id. (SW. side) (rf.)	do	Nov. 8	1.00 p. m.		Co., R
			Nov. 9	6.00 a. m.		Co., R
H. 4919	Ibugos Id. (S. end) N. 77° W., 1 mile (20° 19′ 15″ N., 121° 51′ E.)	do	do	(?) *	64	
H. 4920	Ibugos Id. (S. end) N. 81° W., 1.25 miles (20° 19′ 15″ N., 121° 51′ 20″ E.)	do	do	11.18 a. m.	46	
D. 5321	Ibugos Id. (S. end) S. 89° W., 1.25 miles (20° 19′ 30″ N., 121° 51′ 15″ E.)	do	do	11.23 a. m.	26	wh. S., Co., brk. Sh.
				11.25 a. m.	26	wh. S., Co., brk. Sh.
D. 5322	Ibugos Id. (S. end) S. 84° W., 1.25 miles (20° 19′ 36″ N., 121° 51′ 15″ E.)	do	do	11.42 a. m.	21	wh. S., Co., brk. Sh.
	China Sea, vicinity of Batanes.					
D. 5323	Ibugos Id. (S. end), N. 0° 30′ W., 12 miles (20° 07′ 15″ N., 121° 50′ E.).	C. S. 4710; July, 1905.	Nov. 9	1.39 p. m.	303	
				2.12 p. m.	303	
D. 5324	Ibugos Id. (S. end), N. 15° E., 10.50 miles (20° 09′ N., 121° 47′ E.).	do	do	3.19 p. m.	564	rky.
				4.10 p. m.	564	rky.
	Port San Pio Quinto, Camiguin Id. (rf.).	C. S. 4711; May, 1907.	Nov. 10	9.30 a. m.		Co., R.
				1.30 p. m.		Co., R.
	Port San Pio Quinto (beach).	do	do	1.30 p. m.		S., P.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
80	80	57.5	1.02461	1.02482	Luc. sdr. (a)					
81	80				12′ Tnr.; m. b.	botm.	17			
78	80	53.6	1.02461	1.02513	Luc. sdr. (a)					
77	80				12′ Tnr.; m. b.	botm.	15			
78	78	59.5	1.02461	1.02526	Luc. sdr. (a)					
78	79				12′ Tnr.; m. b.	botm.	20			
78	79				K2	surface.	20			Towed from horse block.
79	79	54.4	1.02500	1.02506	Luc. sdr. (a)					
80	79				12′ Tnr.; m. b.	botm.	20			
82	80	53.4	1.02481	1.02517	Luc. sdr. (a)					
82	80				12′ Tnr.; m. b.	botm.	25			Mud bag torn.
82	80	50.6	1.02474		Luc. sdr. (a)					
81	80				12′ Tnr.; m. b.	botm.	20			
81	79				Luc. sdr. (a)					Sounding outfit lost with 340 fms. wire.
80	79				12′ Tnr.; m. b.	botm.	6			Bridle stop carried away; net came up, upside down.
79	79				int. 4 §	20 fms.	27 6			40 fms. dredge cable out.
79	78				Luc. sdr. (a)					Sounding outfit lost with 689 fms. wire. May not have reached bottom.
79	78				Luc. sdr. (a)					Outfit and stray line lost while heaving in.
80	80				Luc. sdr. (a)					Strong current.
80	80	36.2		1.02574	Luc. sdr. (a)					Therm. possibly tripped at 930 fms.
80	80				int. 4, 2; K2 §	500 fms.	20 33			
80	80	36.4			Luc. sdr. (a)					
					dyn	10–20 ft.	3 30			8 shots.
					dyn	10–25 ft.	4 00			9 shots.
					dyn	10–25 ft.	2 00			2 shots.
					Tnr.-Blish sdr. (e).					
					Tnr.-Blish sdr. (e).					
82	81				Tnr.-Blish sdr. (e).					
82	81				9′ Jn. dr.	botm.	4	N.	0.2	
82	81				9′ Jn. dr.	botm.	9	N.	.2	Sounding with hand lead.
81	82	58.4	1.02558		Luc. sdr.(a)					
81	82				12′ Tnr.; m. b.	botm.	20	N. 62° W.	3.2	
82	82	40.9	1.02523	1.02533	Luc. sdr.(a)					
78	81				12′ Tnr.; m. b.	botm.	2			Trawl lost; bridle and mud bag recovered.
					dyn	12–20 ft.	2 30			2 shots.
					dyn	12–25 ft.	3 00			3 shots.
					130′ seine	10 ft.	3 00			5 hauls.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	China Sea, vicinity of Batanes—Continued.					
			1908.		*fms.*	
....	Port San Pio Quinto (beach at head of bay).	C. S. 4711; May, 1907.	Nov. 11	9.00 a. m.	....	fne. S............
....	Port San Pio Quinto (rf.)....	.....do......	...do.....	8.30 a. m.	....	sctrd. Clmps. Co..
				1.30 p. m.	....	sctrd. Clmps. Co..
			Nov. 12	6.00 a. m.	....	sctrd. Clmps. Co..
	Off northern Luzon.					
D. 5325	Hermanos Id. (N.), N. 86° E., 16.75 miles (18° 34′ 15″ N., 121° 51′ 15″ E.).	C. S. 4711; May, 1907.	Nov. 12	10.45 a. m.	224	gn. M............
				11.13 a. m.	224	gn. M............
D. 5326	Hermanos Id. (N.), N. 69° E., 8 miles (18° 32′ 30″ N., 122° 01′ E.).	.....do......	...do.....	1.00 p. m.	230	M................
				1.28 p. m.	230	M................
D. 5327	Hermanos Id. (N.), N. 55° E., 6.80 miles (18° 31′ 30″ N., 122° 03′ E.).	.....do......	...do.....	2.16 p. m.	198	sft. M., fne. S......
				2.39 p. m.	198	sft. M., fne. S......
....	Port San Vicente, Luzon side (beach).[a]	.....do......	Nov. 13	2.00 p. m.	....	M., S., grass, etc..
			Nov. 18	8.00 a. m.	....	M., S., sticks, leaves.
....	Channel bet. Palaui and San Vicente Islands, Palaui side (beach).	.....do......	...do.....	3.00 p. m.	....	S., M., grass.......
....	Palaui Id. (W. side) (rf.)....	.....do......	...do.....	10.00 a. m.	....	sctrd. Co., S.......
....	Palaui Id. (W. side), small stream.	.....do......	...do.....	2.00 p. m.	....	....
D. 5328	Hermanos Id., N. 79° E., 28.40 miles (18° 29′ 45″ N., 121° 39′ E.).	.....do......	Nov. 19	9.23 a. m.	150	bl. M.............
				9.44 a. m.	150	bl. M.............
D. 5329	Font Id. (W.), N. 28° E., 24.25 miles (18° 33′ N., 121° 37′ 30″ E.).	.....do......	...do.....	10.58 a. m.	212	bl. M.............
				11.25 a. m.	212	bl. M.............
D. 5330	Font Id. (W.), N. 24° E., 23.30 miles (18° 33′ 30″ N., 121° 39′ 15″ E.).	.....do......	...do.....	1.12 p. m.	178	br. M.............
				1.33 p. m.	178	br. M.............
	Off western Luzon.					
D. 5331	Hermana Menor Id. (E.), N. 13° E., 7.30 miles (15° 36′ 45″ N., 119° 47′ 45″ E.).	C. S. 4712; Sept., 1904.	Nov. 22	8.12 a. m.	178	S., Sh., M.........
				8.41 a. m.	178	S., Sh., M.........
....	Port Matalvi (rf.)...........	.....do......	...do.....	10.30 a. m.	....	sctrd. Co., S.......
				1.30 p. m.	....	sctrd. Co., S.......
....	Port Matalvi (anch.).........	.....do......	...do.....	7.45 p. m.	....	....
....	Port Matalvi (rf.)...........	.....do......	Nov. 23	6.00 a. m.	....	sctrd. Co., S.......
....	Port Matalvi (E. side San Salvador Id.) (beach).	.....do......	...do.....	8.30 a. m.	....	S., Co., grass......
....	Port Matalvi (E. side Macalaba Id.) (beach).	.....do......	...do.....	1.30 p. m.	....	S., M., grass.......
....	Port Matalvi (rf.)...........	.....do......	...do.....	1.30 p. m.	....	sctrd. Co.........
	Mindoro Strait.					
....	Paluan Bay, Pantocomi Pt..	C. S. 4345; Feb., 1905.	Dec. 11	7.15 a. m.	....	R., Co............
....	Paluan Bay, Lipa Beach....	.....do.....	...do....	8.30 a. m.	....	S., P ....
....	Paluan Bay, Paluan River...	.....do.....	...do....	9.00 a. m.	....	M................
....	Paluan Bay, Malugao River.	.....do.....	...do....	2.00 p. m.	....	M., sticks, leaves..
....	Paluan Bay, beach N. of Malugao River.	.....do.....	...do....	3.00 p. m.	....	M................
....	Paluan Bay, Caluagan River.	.....do.....	...do....	3.00 p. m.	....	....
....	Paluan Bay, anch..........	.....do.....	...do....	7.00 p. m.	....	....

[a] On November 14 a party went up Palaui River about 3 or 4 miles, in prahm, seining with 25-foot and 45-foot seines at intervals along entire distance.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					130′ seine	5 ft	3 00			7 hauls.
					25′ seine	3 ft	1 30			12 hauls in small stream.
					45′ seine	3 ft	1 30			10 hauls in small stream.
					dyn	12–20 ft.	3 30			4 shots.
					dyn	12–20 ft.	4 00			
					dyn	12–25 ft.	1 00			2 shots.
81	82	53.2	1.02491	1.02525	Luc. sdr.(a)					
81	82				12′ Tnr.; m. b.	botm	19	S. 50° E.	1.0	
82	81	55.4	1.02437	1.02496	Luc. sdr.(a)					
81	81				12′ Tnr.; m. b.	botm	20	S. 60° E.	2.0	
82	82	(?)	1.02434	1.02468	Luc. sdr.(a)					Therm. failed to trip.
81	81				12′ Tnr.; m. b.	botm	20			
					130′ seine	5 ft	3 00			7 hauls.
					130′ seine	5 ft	4 00			Do.
					130′ seine	2–4 ft	1 30			4 hauls.
					dyn	10–20 ft.	5 00			7 shots in a. m.; several in p. m.
					45′ seine		2 00			3 hauls.
78	79	53.9	1.02464	1.02513	Luc. sdr.(a)					
78	78				12′ Tnr.; m. b.	botm	20	N. 52° W.	1.2	
79	78	51.4	1.02492	1.02593	Luc. sdr.(a)					
79	78				12′ Tnr.; m. b.	botm	10	N. 50° W.	2.2	
78	78	53.4	1.02516	1.02523	Luc. sdr.(a)					
78	78				12′ Tnr.; m. b.	botm	20	(?)	(?)	
80.5	80	54.7	1.02422	1.02496	Luc. sdr.(a)					
80.5	80				12′ Tnr.; m. b.	botm	20	S. 49° E.	2.0	
					dyn	10–20 ft.	1 30			3 shots.
					dyn	10–20 ft.	3 30			4 shots.
					dip; e. l.	surf	1 30			2 dynamite caps exploded at gangway.
					dyn	10–30 ft.	5 00			8 shots.
					130′ seine	4–10 ft.	3 00			7 hauls.
					130′ seine	2–4 ft	2 00			4 hauls.
					dyn	8–20 ft.	2 00			4 shots.
					dyn	10–20 ft.	4 15			4 shots.
					130′ seine	8 ft	3 00			10 hauls.
					25′ seine	2 ft	2 00			Do.
					130′ seine	5 ft	2 30			5 hauls.
					25′ seine	3 ft	30			4 hauls.
					16′ seine					
					dip; e. l.	surface	1 30			

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Mindoro Strait—Continued.					
			1908.		*fms.*	
....	Sablayan Bay, near Sablayan.	C. S. 4345; Feb.,1905.	Dec. 12	10.00 a. m.	....	Co ....
D. 5332	Apo Lt., S. 66° W., 18.2 miles (12° 47′ 15″ N., 120° 41′ E.).	C. S. 4714; June, 1906.	...do....	10.39 a. m.	745	gn. M ....
				11.50 a. m.	....	....
H. 4921	Apo Lt., S. 65° W., 19.4 miles.	.....do.....	...do....	1.50 p. m.	584	gy. M., crs. S......
....	Sablayan Bay, Sablayan Pt..	C. S. 4345; Feb., 1905.	...do....	3.30 p. m.	....	....
....	Sablayan Bay, anch	.....do.....	...do....	7.00 p. m.	....	....
....	Sablayan Bay, Sablayan Pt..	.....do.....	Dec. 13	10.00 a. m.	....	co. R ....
....	Sablayan Bay, Pandan Id...	.....do.....	...do....	10.00 a. m.	....	Co ....
....	Sablayan Bay, Bagaong River.	.....do.....	...do....	10.00 a. m.	....	....
....	Sablayan Bay, anch	.....do.....	...do....	9.00 p. m.	....	....
D. 5333	Apo Lt., N. 45° W., 19 miles (12° 26′ 30″ N., 120° 37′ 45″ E.).	C. S. 4714; June, 1906.	Dec. 14	7.40 a. m.	310	S ....
				8.26 a. m.	....	....
D. 5334	Apo Lt., N. 44° W., 19.7 miles (12° 25′ 40″ N., 120° 38′ E.).	.....do.....	...do....	9.18 a. m.	612	gy. M ....
				9.58 a. m.	....	....
				10.17 a. m.	....	....
....	Tara Id., west	.....do.....	...do....	3.00 p. m.	....	dense Co ....
....	Tara Id., anch	.....do.....	...do....	7.00 p. m.	....	....
....	Tara Id., west	.....do.....	Dec. 15	7.30 a. m.	....	....
....	Tara Id., bayou near village..	.....do.....	...do....	7.30 a. m.	....	sft. M ....
....	Tara Id., beach near village..	.....do.....	...do....	9.00 a. m.	....	S., Co., grass ....
	Busuanga Id.					
....	Port Caltom	C. S. 4714; June, 1906.	Dec. 15	2.00 p. m.	....	sctrd. Co ....
....	Port Caltom, beach near village.	.....do.....	...do....	2.00 p. m.	....	S., Co., W ....
....	Port Caltom, anch	.....do.....	...do....	7.00 p. m.	....	....
....	Port Caltom, Pangauran River.	.....do.....	Dec. 16	7.00 a. m.	....	....
....	Port Uson, Malbato River...	C. S. 4345; Feb., 1905.	Dec. 17	1.00 p. m.	....	....
....	Port Uson, Mayanpayan Id..	.....do.....	...do....	2.00 p. m.	....	sctrd. Co ....
....	Port Uson, anch	.....do.....	...do....	8.00 p. m.	....	....
	Linapacan Strait.					
D. 5335	Observatory Id. (N.), S. 55° W., 10.7 miles (11° 37′ 15″ N., 119° 48′ 45″ E.).	C. S. 4716; Jan., 1903.	Dec. 18	12.22 p. m.	46	S., M ....
				12.43 p. m.	....	....
D. 5336	Observatory Id. (N.), S. 42° W., 9 miles (11° 37′ 45″ N., 119° 46′ E.).	.....do.....	...do....	1.16 p. m.	46	S., M ....
				1.26 p. m.	....	....
....	Linapacan Id., Malcochin Harbor.	.....do.....	...do....	3.30 p. m.	....	S., W., Co ....
....	Linapacan Id., Malcochin Harbor, anch.	.....do.....	...do....	8.00 p. m.	....	....
....	Linapacan Id., Malcochin Harbor, beach.	.....do.....	Dec. 19	8.00 a. m.	....	S. Co ....
....	Linapacan Id., Malcochin Harbor reef.	.....do.....	...do....	8.00 a. m.	....	sctrd. Co ....
....	Observatory Id., west beach.	.....do.....	...do....	2.30 p. m.	....	S., Co., W ....
....	Observatory Id., west	.....do.....	...do....	2.30 p. m.	....	sctrd. Co ....
	Palawan Passage.					
D. 5337	Observatory Id. (N.), S. 80° E., 13.8 miles (11° 34′ N., 119° 26′ E.).	C. S. 4716; Jan., 1903.	Dec. 20	7.31 a. m.	43	fne. Co., S., M ....
				7.40 a. m.	....	....
D. 5338	Observatory Id. (N)., S. 82° E., 15 miles (11° 33′ 45″ N., 119° 24′ 45″ E.).	.....do.....	...do....	8.04 a. m.	43	Co., S., M ....
				8.12 a. m.	....	....
				8.15 a. m.	....	....
H. 4922	Cauayan Id. (N.), S. 37° E., 11.5 miles (11° 25′ 45″ N., 119° 14′ E.).	.....do.....	...do....	10.01 a. m.	21	Co., S., Sh ....
D. 5339	Cauayan Id. (N.), S. 59° E., 10 miles (11° 22′ N., 119° 12′ E.).	.....do.....	...do....	10.32 a. m.	52	M ....
				10.43 a. m.	....	....
....	North Guntao Id	.....do.....	...do....	1.00 p. m.	....	Co., S ....

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dyn.	6-12 ft.	4 30			9 shots.
84	81	38.2	1.02385	1.02548	Luc. sdr. (a)					
82	81				12′ Tnr.; m. b.	botm.	20			
83	82	40.2	1.02401	1.02535	Luc. sdr. (a)					
					dyn.		1 30			4 shots.
					dip; e. l.	surface.	1 30			
					copper sulphate.		2 00			Work done in tide pools.
					dyn.	6-9 ft.	2 00			5 shots.
					16′ seine		6 00			
					dip; e. l.	surface.	1 00			
79	80	73.8	1.02406	1.02543	Luc. sdr. (a)					
81	80				12′ Agz.; m. b.	botm.	22			
81	80	43.2	1.02385	1.02516	Luc. sdr. (a)					
					K. 2	surface.	1 02			
82	80				12′ Agz.; m. b.	botm.	7	S. 60° W.	2.0	All gear but mud bag lost.
					dyn.	10-20 ft.	2 00			3 shots.
					dip; e. l.	surface.	1 00			
					dyn.	10-20 ft.	4 00			5 shots.
					130′ seine	3 ft.	1 30			2 hauls.
					25′ seine	2 ft.	1 30			12 hauls.
					dyn.	10-20 ft.	3 00			8 shots.
					130′ seine	4 ft.	3 00			6 hauls.
					dip; e. l.	surface.	1 30			
					dyn.; 25′ seine.		9 00			10 shots.
					dyn.		4 00			
					dyn.	10-20 ft.	2 30			
					dip; e. l.	surface.	1 00			
82	80				Tnr. sdr. (e)					Therm. failed to trip.
83	81				9′ Tnr.; m. b.	botm.	17	N. 77° W.	1.2	
83	81				Tnr. sdr. (e)					No therm. used.
					9′ Tnr.; m. b.	botm.	6	N. 80° W.	1.2	Lost bottom of net.
					130′ seine	3 ft.	1 30			3 hauls.
					dip; e. l.	surface.	1 00			
					130′ seine	3 ft.	4 00			7 hauls.
					dyn.	10-20 ft.	4 00			11 shots.
					130′ seine	4 ft.	2 30			6 hauls.
					dyn.	15 ft.				1 shot.
81	80		1.02427		Tnr. sdr. (e)					No therm. used.
					9′ Tnr.; m. b.	botm.	9	S. 82° W.	1.0	
81	80				Tnr. sdr. (e)					Do.
81	80				9′ Tnr.; m. b.	botm.	20	N. 70° W.	1.3	
					K. 2	surface.	20			
					Tnr. sdr. (e)					Do.
83	81		1.02406		Tnr. sdr. (e)					
84	81				9′ Tnr.; m. b.	botm.	20	S. 58° W.	2.2	
					ynd.	24-30 ft.	2 30			7 shots.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Malampaya Sound, Palawan Id.					
			1908.		*fms.*	
....	Bolalo Bay, anch............	C. S. 4349; Aug., 1908.	Dec. 20	8.30 p. m.	....	....
....	Bolalo Bay, flats near shore..	.....do.....	Dec. 21	8.00 a. m.	....	S., Co., W........
....	Bolalo Bay, mouth of bay...	.....do.....	...do....	8.00 a. m.	....	Co., W........
....	Bolalo Bay, head of bay.....	.....do.....	...do....	1.00 p. m.	....	....
....	Bolalo Bay, anch...........	.....do.....	...do....	7.30 p. m.	....	....
....	Bolalo Bay, near anch.......	.....do.....	...do....	9.00 p. m.	....	....
D. 5340	Cone Id., N. 2° E., 1.5 miles (10° 55′ 51″ N., 119° 14′ 12″ E.).	.....do.....	Dec. 22	.... 8.22 a. m.	19-24	....
....	Endeavor Strait, near Relinquish Head.	.....do.....	...do....	9.00 a. m.	....	....
....	Endeavor Strait, Chase Head.	.....do.....	...do....	2.00 p. m.	....	Co., S........
....	Endeavor Strait, Limunancong.	.....do.....	...do....	2.00 p. m.	....	S........
....	Endeavor Strait, Relinquish Head to Nalinbungan Pt.	.....do.....	Dec. 23	8.00 a. m.	....	Co., S........
D. 5341	Endeavor Pt. (W.), S. 18° E., 1.2 miles (10° 57′ 51″ N., 119° 17′ 26″ E.).	.....do.....	...do....	.... 2.03 p. m.	19-22	gy. M........
D. 5342	Endeavor Pt. (S.), S. 58° E., 0.5 miles (10° 56′ 55″ N., 119° 17′ 24″ E.).	.....do.....	...do....	.... 2.35 p. m.	14-25	gy. M........
....	Endeavor Strait, anch. bet. Bando and Endeavor points.	.....do.....	...do....	8.00 p. m.	....	....
....	Endeavor Strait, anch. bet. Bando and Endeavor points.	.....do.....	...do....	8.30 p. m.	....	....
....	Malapina Id., N. W.........	.....do.....	Dec. 24	8.00 a. m.	....	Co., S., W........
....	Inner Sound, near Pancol....	.....do.....	Dec. 25	1.00 p. m.	....	S., R........
D. 5343	Cliff Id., S. 22° E., 5.2 miles (10° 51′ 35″ N., 119° 23′ 24″ E.).	.....do.....	Dec. 26	7.46 a. m.	*5	M........
D. 5344	Cliff Id., S. 34° E., 4.7 miles (10° 50′ 40″ N., 119° 22′ 32″ E.).	.....do.....	...do....	.... 8.22 a. m.	6	M........
....	Inner Sound, Malampaya River.	.....do.....	...do....	9.00 a. m.	....	sft. M........
D. 5345	Cliff Id., S. 43° E., 4.4 miles (10° 50′ N., 119° 22′ 03″ E.).	.....do.....	...do....	.... 9.16 a. m.	7	M........
D. 5346	Cliff Id., S. 37° E., 4.6 miles (10° 50′ 30″ N., 119° 22′ 20″ E.).	.....do.....	...do....	10.18 a. m.	*7	M........
D. 5347	Cliff Id., S. 26° E., 4.5 miles (10° 50′ 44″ N., 119° 23′ 09″ E.).	.....do.....	...do....	.... 10.58 a. m.	5	M........
	Palawan Passage.					
H. 4923	Pt. Tabonan, S. 87° E., 11.4 miles (10° 57′ 15″ N., 119° 1′ E.).	C. S. 4716; Jan., 1903.	Dec. 27	6.32 a. m.	51	Co., S........
H. 4924	Pt. Tabonan, East, 16.3 miles (10° 57′ N., 118° 55′ 45″ E.).	.....do.....	...do....	7.10 a. m.	62	S........
H. 4925	Pt. Tabonan, S. 87° E., 24.3 miles (10° 58′ 15″ N., 118° 47′ 15″ E.).	.....do.....	...do....	8.05 a. m.	184	fne. Co., S........
D. 5348	Pt. Tabonan, S. 89° E., 33.5 miles (10° 57′ 45″ N., 118° 38′ 15″ E.).	.....do.....	...do....	9.28 a. m. 10.09 a. m.	375	Co., S........
D. 5349	Pt. Tabonan, N. 85° E., 45.2 miles (10° 54′ N., 118° 26′ 20″ E.).	.....do.....	...do....	12.41 p. m. 1.40 p. m.	730	Co., S........
D. 5350	Pt. Tabonan, N. 76° E., 43.7 miles (10° 46′ 40″ N., 118° 29′ E.).	.....do.....	...do....	4.10 p. m. 5.14 p. m.	515	gy. M........

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dip; e. l.	surface.	1 00			
					130′ seine	2-4 ft	3 30			11 hauls.
					dyn	6-9 ft	3 30			5 shots.
					dyn		4 00			3 shots.
					dip; e. l.	surface.	1 00			
					K2, K5	surface.	20			Tow'd from wherry.
					hand line					
81	80				int. 3 §	17-22 fms.	20 1	N. 3° W.	0.4	
					dyn		2 00			5 shots.
					dyn	9-12 ft	2 00			3 shots.
					25′ and 130′ seines.	5 ft	2 00			13 hauls.
					dyn	18-20 ft.	6 00			13 shots.
83	82				hand line					
83	82				9′ Tnr.; m. b.	botm	15	S. 2° E.	.7	
83	82				hand line					
83	82				9′ Tnr.	botm	19	S. 25° W.	.7	Net slightly torn.
					K2; 2′ o. p.	surface.	20			Towed from steam launch.
					dip; e. l.	surface.	1 30			
					dyn		3 30			11 shots.
					dyn		4 00			3 shots.
80	81				6′ McC.	botm	15	S. 78° W.	.4	
					hand line					
81	81				6′ McC.	botm	26	S. 18° W.	.7	
					dyn.; 130′ seine	3-6 ft	6 00			6 shots, 4 hauls.
					hand line					
80	81				9′ Tnr	botm	20	N. 47° W.	.6	
81	80				9′ Tnr	botm	10	S. 72° E.	1.0	
					hand line					
81	81				9′ Tnr	botm	10	N. 36° E.	.5	
					Tnr. sdr. (e)					
					Tnr. sdr. (e)					
					Luc. sdr. (a)					
82	81	56.4	1.02422	1.02576	Luc. sdr. (a)					
82	81				12′ Tnr.; m. b.	botm	20	N. 80° W.	1.5	No land in sight; latitude and longitude approximate.
		40.6	1.02406	1.02564	Luc. sdr. (a)					
83	81				12′ Tnr.; m. b.	botm	20	S. 80° W.	1.5	Do.
			1.02381	1.02523	Luc. sdr. (a)					
82	80				12′ Tnr.; m. b.	botm	20	S. 85° W.	3.0	Do.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Palawan Passage—Cont'd.		1908.		*fms.*	
D. 5351	Pt. Tabonan, N. 62° E., 47 miles (10° 35′ N., 118° 30′ E.).	C. S. 4716; Jan., 1903.	Dec. 27	8.43 p. m. 8.53 p. m.	50	Co., S
	Ulugan Bay, Palawan Id.					
	Oyster Inlet	C. S. 4346; Aug., 1905.	Dec. 28	9.00 a. m.		S., Co
	Baheli River to Wood Pt.	do	do	9.30 a. m.		M., S., W
	Magsiapo Reef	do	do	1.00 p. m.		Co.
	Sagumay Pt.	do	do	1.00 p. m.		S., Co
	Anchorage (near Tidepole Pt.).	do	do	8.30 p. m.		
	Rita Id. (W. and S.)	do	Dec. 29	8.00 a. m.		S., Co
	Caiholo River	do	do	11.00 a. m.		G., bowlders
D. 5352	Tidepole Pt., S. 84° W., 0.4 mile (10° 04′ 30″ N., 119° 05′ E.).	do	Dec. 30	 6.18 a. m.	25	M
	Nakoda Bay, Palawan Id.					
	Sirinao Id. (SW.)	C. S. 4346; Aug., 1905.	Dec. 30	3.00 p. m.		S., W
	River (unnamed), SE. of Maricaban Id.	do	Dec. 31	6.00 a. m.		M., S., G.
	Balabac Strait.		1909.			
D. 5353	Cape Melville Lt., S. 85° E., 16.8 miles (7° 50′ 45″ N., 116° 43′ 15″ E.).	C. S. 4309; Nov., 1906.	Jan. 1	6.33 a. m. 7.10 a. m.	148	
D. 5354	Cape Melville Lt., N. 85° E., 16.8 miles (7° 47′ 50″ N., 116° 43′ 15″ E.).	do	do	8.33 a. m. 9.55 a. m.	117	M.
	North Balabac Strait.					
	Caxisigan Id. (W.)	C. S. 4347; Dec., 1905.	Jan. 2	1.00 p. m.		Co., S
	Port Ciego, Martinez Pt.	do	Jan. 3	9.00 a. m.		W., Co
	Port Ciego, Paz Id.	do	do	9.00 a. m.		W., Co.
	Candaraman Id. (E.)	do	Jan. 4	8.30 a. m.		S., Co
	Bugsuk Id. (S.)	C. S. 4309; Nov., 1906.	Jan. 5	8.00 a. m.		S., Co
D. 5355	Balabac Lt., S. 61° W., 16.6 miles (8° 08′ 10″ N., 117° 19′ 15″ E.).	do	do	9.40 a. m. 9.52 a. m.	44	Co., S
D. 5356	Balabac Lt., S. 64° W., 15.5 miles (8° 06′ 40″ N., 117° 18′ 45″ E.).	do	do	10.21 a. m. 10.36 a. m.	58	S., Sh.
D. 5357	Balabac Lt., S. 65° W., 14.3 miles (8° 06′ N., 117° 17′ 10″ E.).	do	do	11.13 a. m. 11.27 a. m.	68	Co., S
	Jolo Sea.					
	Taganak Id. (SE.)	C. S. 4720; Jan., 1904.	Jan. 7	1.00 p. m.		Co.
D. 5358	Sandakan Lt., S. 34° W., 19.7 miles (6° 06′ 40″ N., 118° 18′ 15″ E.).	do	do	7.20 p. m. 7.29 p. m.	39	M.
	Cagayan de Jolo (S.)	C. S. 4348; June, 1905.	Jan. 8	8.30 a. m. 9.00 a. m.		Co., S S., Co., W
	Cagayan de Jolo, Singuan Lake.	do	do	3.00 p. m.		M.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Tnr. sdr. (e)					
81	80				12′ Tnr.; m. b.	botm.	2			Net wrecked; latitude and longitude approximate.
					dyn		3 00			12 shots.
					130′ seine	2-5 ft.	5 00			9 hauls.
					dyn		2 30			2 shots.
					dyn		2 00			Do.
					dip; e. l.	surface.	1 00			
					250′ seine; dyn.	20-40 ft.	2 00			2 hauls, 6 shots.
					25′ seine		3 00			
					hand line					
80	81				int. 4. §	24 fms.	20 2	N. 4° E.	0.9	
					130′ seine	4-10 ft.	1 30			5 hauls.
					dyn.; 16′-45′ seine.		10 00			
					Luc. sdr. (a)					148 fms. sounding wire lost.
75	80				9′ Tnr.; m. b.	botm.	34	SE.		Foggy; latitude and longitude approximate.
					Tnr. sdr. (e)					
75	80				9′ Tnr.; m. b.	botm.	25	SE.		Do.
					dyn	15 ft.				
					dyn	12 ft.	4 00			5 shots.
					dyn		4 30			6 shots.
					dyn	9-15 ft.	2 30			15 shots.
					dyn	9-18 ft.	4 00			Do.
					Tnr. sdr. (e)					
82	82		1.02518		6′ McC.	botm.	19	S. 14° W.	1.6	
85	82				Tnr. sdr. (e)					
85	82				6′ McC.	botm.	16	S. 50° W.	1.3	
85	82				Tnr. sdr. (e)					
					9′ Tnr.; m. b.	botm.	01	N. 45° E.	.6	Net torn.
					dyn	15 ft.	4 00			10 shots.
					Tnr. sdr. (e)					
80	82				12′ Agz.; m. b.	botm.	14	N. 56° E.	.7	
					dyn		3 00			5 shots.
					130′ seine	2-4 ft.	2 30			4 hauls.
					dyn	10-40 ft.	1 00			5 shots.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Jolo Sea—Continued.		1909.		*fms.*	
H. 4926	7° 39′ N., 120° 04′ 45″ E	C. S. 4721; Jan., 1903.	Jan. 9	6.11 a. m.	460	M
D. 5359	8° 12′ 45″ N., 120° 37′ 15″ E	do	do	12.52 p. m. 3.31 p. m.	2,275	
	Iloilo Strait.					
	Anilao River, Passi, Panay		Jan. 13			G
	Guimaras Id., vicinity of Buena Vista.	C. S. 4416; Dec., 1907.	Jan. 14			
	Manila Bay.					
	Mariveles Bay	C. S. 4249; Apr., 1904.	Jan. 28	1.00 p. m.		S
	Boca Chica (mouth of North Channel).	C. S. 4240; Feb., 1907.	Jan. 29	a. m.-p. m.		
	Pucot River (near Mariveles)	C. S. 4249; Apr., 1904.	do	8.00 a. m.		
	Mariveles River	do	Jan. 30	1.00 p. m.		
	Mariveles Bay and Pucot River.	do	do	3.00 p. m.		
	Luzon Point	C. S. 4240; Feb., 1907.	Jan. 31	7.30 a. m.		
	Mariveles wharf	C. S. 4249; Apr., 1904.	Feb. 1	8.00 a. m.		
	Mariveles Bay (west)	do	do	2.00 p. m.		
	La Monja (Id.)	C. S. 4240; Feb., 1907.	Feb. 7	— a. m.		
	Luzon Pt	do	do	— p. m.		
D. 5360	Corregidor Lt., N. 74° W., 6.9 miles (14° 21′ N., 120° 41′ E.).	do	do	7.25 p. m.	12	hrd
	Limbones Cove	do	Feb. 8	— p. m.		
	do	do	do	— p. m.		sctrd. Co
D. 5361	Corregidor Lt., S. 89° W., 7.2 miles (14° 24′ 15″ N., 120° 41′ 30″ E.).	do	do	8.48 p. m.	*12	
	China Sea, off western Luzon.					
D. 5362	Cape Santiago Lt., S. 35° E., 14.6 miles (13° 58′ 20″ N., 120° 30′ 30″ E.).	C. S. 4240; Feb., 1907.	Feb. 19	3.57 p. m.	*125	
	Pagapas Bay, Luzon	do	Feb. 20	8.00 a. m.		Co.
	Pagapas Bay, Santiago River	do	do	8.00 a. m.		M., G.
	Balayan Bay, Luzon.					
D. 5363	C. Santiago Lt., S. 79° W., 4.5 miles (13° 47′ 20″ N., 120° 43′ 30″ E.).	C. S. 4240; Feb., 1907.	Feb. 20	9.27 a. m.	*180	
D. 5364	C. Santiago Lt., S. 68° W., 5.4 miles (13° 48′ 30″ N., 120° 43′ 45″ E.).	do	do	2.40 p. m.	*160	
	Taal anchorage	do	do	7.30 p. m.		
D. 5365	C. Santiago Lt., N. 73° W., 6.7 miles (13° 44′ 24″ N., 120° 45′ 30″ E.).	do	Feb. 22	9.04 a. m.	*214	
	Batangas Bay, Luzon.					
D. 5366	Escarceo Lt., S. 5° E., 7.7 miles (13° 39′ N., 120° 58′ 30″ E.).	C. S. 4240; Feb., 1907.	Feb. 22	1.40 p. m.	*240	

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Luc. sdr. (a)					Sounding wire carried away. Latitude and longitude approximate.
					Luc. sdr. (a)					Sounding wire lost. Longitude and latitude approximate.
83	82				12′ Agz. rev					
					dyn	12–18 ft.				15 shots; 1 day's work.
					130′ seine	20–30 ft.				11 hauls; all-day expedition.
					130′ seine	4–10 ft.	4 00			10 hauls.
					4 trawl lines					Half of one trawl went adrift.
					25′ and 130′ seines; dyn.				3.0	All-day expedition.
					25′ seine; dyn.					Half-day expedition.
					dyn		2 00			13 shots.
					3 trawl lines		10 00			
					dyn		2 00			3 shots.
					1 trawl line					
					cod trawls					
					cod trawls					
					hand line					
					25′ Agz.	botm.	1 00	N. 48° E.	1.3	
					cod trawls					
					dyn	15–20 ft.	2 00			5 shots.
76	78				25′ Agz.	botm.	9 08	N. 29° E.	12.0	
					3-bd. int. tr.	60 fms.	12	N. 58° W.	1.0	
					dyn	15 ft.	6 00			8 shots.
					130′ seine	4 ft.	3 00			5 hauls.
					25′ Agz.	botm.	1 15	N. 25° E.	3.0	
					25′ Agz.	botm.	43	N. 45° E.	2.8	
					dip; e. l.	surface.	1 30			
					25′ Agz.	botm.	36	N. 10° W.	3.0	
80	79				3-bd. int. tr.	150 fms.	20	N. 6° E.	2.5	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Verde Island Passage.					
D. 5367	Malabrigo Lt., N. 81° E., 8 miles (13° 34′ 37″ N., 121° 07′ 30″ E.).	C. S. 4240; Feb., 1907.	1909. Feb. 22	5.10 p. m.	*fms.* *180	S.*
	Marinduque Id. and vicinity.					
....	Port Banalacan, Marinduque	C. S. 4453; July, 1904.	Feb. 23	7.30 a. m.	....	Co., S.
D. 5368	Tayabas Lt. (outer), N. 32° W., 21.8 miles (13° 35′ 30″ N., 121° 48′ E.).	C. S. 4714; June, 1906.	...do.....	2.08 p. m. 2.45 p. m.	181	gy. M.
....	Capulaan Bay, Pagbilao, Chica Id.	.....do.....	Feb. 24	7.00 a. m.	....	Co.
....	Tayabas River (3 branches)..	.....do.....	...do.....	7.00 a. m.	....	
D. 5369	Tayabas Lt. (outer), N. 50° W., 8.8 miles (13° 48′ N., 121° 43′ E.).	C. S. 4267; Aug., 1907.	...do....	8.04 a. m. 8.30 a. m.	106	bk. S.
D. 5370	Tayabas Lt. (outer), N. 32° W., 11.6 miles (13° 44′ 15″ N., 121° 42′ 30″ E.).	C. S. 4714; June, 1906.	...do....	9.35 a. m. 9.58 a. m.	159	sft. M.
D. 5371	Tayabas Lt. (outer), N. 43° W., 6 miles (13° 49′ 40″ N., 121° 40′ 15″ E.).	C. S. 4267; Aug., 1907.	...do....	2.32 p. m.	*83	gn. M. (m. b.)
D. 5372	Tabayas Lt. (outer), N. 3° W., 4.5 miles (13° 49′ 12″ N., 121° 36′ 09″ E.).	.....do.....	...do....	3.42 p. m.	*150	gn. M. (m. b.)
....	Tayabas Bay, Lucena anchorage.	.....do.....	...do....	8.00 p. m.	....	
D. 5373	Tayabas Lt. (outer), N. 20° E., 15 miles (13° 40′ N., 121° 31′ 10″ E.).	C. S. 4714; June, 1906.	Mar. 2	9.38 a. m. 10.15 a. m.	338	sft. M.
D. 5374	Tayabas Lt. (outer), N. 9° E., 7.4 miles (13° 46′ 45″ N., 121° 35′ 08″ E.).	.....do.....	...do....	11.57 a. m.	*190	gy. M. (m. b.)
D. 5375	Tayabas Lt. (outer), N. 49° W., 18.2 miles (13° 42′ 15″ N., 121° 50′ 15″ E.).	.....do.....	...do....	3.05 p. m. 3.25 p. m.	107	gn. M.
D. 5376	Tayabas Lt. (outer), N. 53° W., 18.7 miles (13° 42′ 50″ N., 121° 51′ 30″ E.).	.....do.....	...do....	4.19 p. m.	*90	gy. M., S. (m. b.)
....	Pitogo Anchorage, Luzon....	.....do.....	Mar. 3	6.00 a. m.	....	Co.
....	Mompog Id. (S.)	.....do.....	...do....	10.00 a. m.	....	Co., S.
D. 5377	Mompog Id. (E.), N. 55° W., 9 miles (13° 26′ N., 122° 19′ E.).	C. S. 4715; Apr., 1907.	Mar. 4	7.09 a. m. 8.03 a. m.	400	sft. gn. M.
D. 5378	Mompog Id. (E.), N. 38° W., 17 miles (13° 17′ 45″ N., 122° 22′ E.).	.....do.....	...do....	10.02 a. m. 10.40 a. m.	395	sft. gn. M.
H. 4927	Mompog Id. (E.), N. 37° W., 25.6 miles (13° 10′ 35″ N., 122° 27′ 30″ E.).	.....do.....	...do....	1.06 p. m.	730	
D. 5379	Mompog Id. (E.), N. 30° W.. 37 miles (12° 59′ 15″ N., 122° 30′ 40″ E.).	.....do.....	...do....	2.46 p. m. 4.02 p. m.	920	
D. 5380	Mompog Id. (E.), N. 31° W., 33 miles (13° 02′ 45″ N., 122° 29′ E.).	.....do.....	...do....	7.26 p. m.	....	
	Burias Id.					
....	Alimango Bay	C. S. 4715; Apr., 1907.	Mar. 5	8.00 a. m.	....	Co.
....	Alimango River	.....do.....	...do....	9.00 a. m.	....	S., M.
	Ragay Gulf, Luzon.					
....	Alibijaban Id.	C. S. 4715; Apr., 1907.	Mar. 6	9.00 a. m.	....	Co.

Steamer Albatross in the Philippine Islands, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
83	80				25′ Agz.	botm.	26	N. 63° E.	0 9	Rear beam broken and iron frame twisted.
					dyn.	12–24 ft.				8 shots.
					Luc. sdr. (a).					
87	82				12′ Agz.; m. b.	botm.	37	N. 22° W.	6.0	
					dyn.		4 00			10 shots.
					sml. seines; dyn.					All-day expedition by 3 parties.
					Tnr. sdr. (e).					
80	79				12′ Agz.; m. b.	botm.	20	S. 9° W.	1.7	
		54.3			Luc. sdr. (a).					
80	80				12′ Agz.; m. b.	botm.	20	S. 31° W.	3.3	
83	80				12′ Agz.; m. b.	botm.	22	S. 87° W.	.9	
82	81				12′ Agz.; m. b.	botm.	21	S. 74° E.	1.5	
					dip; e. 1.	surface.	1 00			
82	80	51.8	1.02550		Luc. sdr. (a).					
81	80				12′ Tnr.; m. b.	botm.	20	N. 32° E.	4.5	
82	80				12′ Tnr.; m. b.	botm.	33	N. 29° E.	2.0	
					Tnr. sdr. (e).					
82	80				12′ Agz.; m. b.	botm.	20	N. 39° W.	1.5	
82	80				12′ Agz.; m. b.	botm.	22	N. 11° W.	1.5	Net torn in two places near mouth.
					dyn.	10–20 ft.	1 00			1 shot.
					dyn.	12–18 ft.	6 00			15 shots.
		49.6			Luc. sdr. (a).					
79	80				12′ Agz.; m. b.	botm.	13	S. 31° E.	2.5	Net completely wrecked.
		50.4			Luc. sdr. (a)					
80	80				12′ Agz.; m. b.	botm.	20	S. 40° E.	3.5	Net wrecked; pieces recovered.
85	81	50.4			Luc. sdr. (a).					
		50.5	1.02443		Luc. sdr. (a).	botm.	30	N. 43° W.	5.3	
83	81				12′ Agz.; m. b.					
82	81				int. 4					Net lost while veering out.
					dyn.	12–24 ft.	9 00			20 shots.
					130′ seine; dyn.	4 ft.	3 00			2 hauls, 5 shots.
					dyn.	12–30 ft.	5 00			20 hauls.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Ragay Gulf, Luzon—Cont'd.		1909.		*fms.*	
D. 5381	Arena Pt. (Luzon), S. 68° W., 2.8 miles (13° 14′ 15″ N., 122° 44′ 45″ E.).	C. S. 4715; Apr., 1907.	Mar. 6	9.15 a. m. 9.35 a. m.	88	co. S
D. 5382	Arena Pt. (Luzon), S. 55° W., 3.8 miles (13° 15′ 20″ N., 122° 45′ 30″ E.).	do	do	10.02 a. m. 10.23 a. m.	128	M
	Burias Id.					
	Port Busin	C. S. 4454; May, 1906.	Mar. 6	8.00 p. m.		
	do	do	Mar. 7	6.00 a. m.		Co.
	do	do	Mar. 8	6.00 a. m.		Co.
	do	do	do	8.00 a. m.		
D. 5383	Arena Pt. (Luzon), S. 66° W., 22 miles (13° 22′ N., 123° 02′ 30″ E.).	C. S. 4715; Apr., 1907.	do	3.08 p. m. 3.35 p. m.	127	gn. M
D. 5384	Arena Pt. (Luzon), S. 64° W., 20.7 miles (13° 22′ 15″ N., 123° 01′ 15″ E.).	do	do	4.03 p. m. 4.32 p. m.	220	
	Port Busin	C. S. 4454; May, 1906.	do	7.00 p. m.		
	Ragay Gulf, Luzon.					
	Refugio Id., Pasacao Anchorage.	C. S. 4454; May, 1906.	Mar. 9	8.00 a. m.		R.
D. 5385	Arena Pt. (Luzon), S. 61° W., 23.7 miles (13° 24′ 50″ N., 123° 03′ 70″ E.).	C. S. 4715. Apr., 1907.	do	9.22 a. m. 9.54 a. m.	327	gy. M
	Galvaney Id. (near Caima Bay).	do	do	3.00 p. m.		Co
D. 5386	Arena Pt. (Luzon), S. 5° W., 25.3 miles (13° 38′ 30″ N., 122° 44′ 30″ E.).	do	do	3.25 p. m. 3.55 p. m.	287	
	Ragay Bay (anchorage)	do	do	7.00 p. m.		
	Ragay River	do	Mar. 10	7.30 a. m.		S.
	Ragay Bay	do	do	7.30 a. m.		Co., S.
	Between Burias and Luzon.					
	Canmahala Bay, Luzon	C. S. 4715; Apr., 1907.	Mar. 11	8.00 a. m.		Co., S.
D. 5387	Bagatao Id. Lt. (outer), S. 80° E., 27 miles (12° 54′ 40″ N., 123° 20′ 30″ E.).	do	do	1 06 p. m. 1.42 p. m.	209	soft gn. M.
D. 5388	Bagatao Id. Lt. (outer), S. 86° E., 21 miles (12° 51′ 30″ N., 123° 26′ 15″ E.).	do	do	2.51 p. m. 3.27 p. m.	226	soft gn. M.
	Bagatas Id. (anchorage)	do	do	7.15 p. m.		
	Between Ticao Id. and Luzon.					
D. 5389	Bagatao Id. Lt. (outer), N. 3° W., 14 miles (12° 35′ 45″ N., 123° 48′ 18″ E.).	C. S. 4219; Dec., 1904.	Mar. 12	1.46 p. m.	*109-80	S.*
D. 5390	Bagatao Id. Lt. (outer), N. 12° W., 19 miles (12° 30′ 54″ N., 123° 51′ 30″ E.).	do	do	2.56 p. m.	*54	fne. S.*
	Between Samar and Masbate.					
	Escarpada Id., Bagacay Bay.	C. S. 4220; May, 1907.	Mar. 13	6.00 a. m.		Co., S.
	Destacado Id., Lode Bay	do	do	8.00 a. m.		R., Co.
D. 5391	Tubig Pt. (Destacado Id.), N. 31° E., 3 miles (12° 13′ 15″ N., 124° 05′ 03″ E.).	do	do	9.07 a. m.	*118	
D. 5392	Tubig Pt., N. 49° E., 5 miles (12° 12′ 35″ N., 124° 02′ 48″ E.).	do	do	9.54 a. m. 10.10 a. m.	135	gn. M., S.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Tnr. sdr. (e)					
82	80				12′ Agz.; m. b.	botm.	15	N. 13° E.	1.3	
					Tnr. sdr. (e)					
83	79				12′ Agz.; m. b.	botm.	15	N. 18° E.	1.5	
					2 gill nets	surface				Hauled 6 a. m. on 8th.
					dyn	10–18 ft.	2 30			4 shots.
					dyn	10–20 ft.	5 00			9 shots.
					copper sulphate.		2 00			Beach and tide pools.
		62.5			Luc. sdr. (a)					
84	80		1.02293		12′ Agz.; m. b.	botm.	20	N. 70° W.	1.3	
		62.4			Luc. sdr. (a)					
84	80				12′ Agz.; m. b.	botm.	25	N. 74° W.	2.7	
					dip; e. l.	surface.	1 00			
					dyn	12–30 ft.	4 00			12 shots.
		62.4			Luc. sdr. (a)	botm.	13	N. 47° W.	1.6	
82	78				12′ Agz.; m. b.					
					dyn	10–25 ft.	2 00			7 shots.
		62.4			Luc. sdr. (a)					
83	82		1.02487		12′ Agz.; m. b.	botm.	8	N. 30° E.	1.3	Net badly torn.
					dip; e. l.	surface.	1 00			
					16,130 seines; dyn.	3–5 ft.	2 30			Half-day trip.
					dyn	4–20 ft.	4 00			10 shots.
					dyn	4–30 ft.	3 30			8 shots.
		52.4			Luc. sdr. (a)					
85	79		1.02503		12′ Agz.; m. b.	botm.	20	N. 44° E.	.8	
					K2	surface.	20	N. 44° E.	.8	
		51.4			Luc. sdr. (a)					
84	78				12′ Agz.; m. b.	botm.	26	N. 67° E.	1.5	
					K2	surface.	26	N. 67° E.	1.5	
					dip; e. l.	surface.	45			
78	78				3-bd. int. tr.	40–55 fms.	17	N. 79° E.	1.6	
79	78				3-bd. int. tr.	50 fms.	26	N. 58° E.	1.5	
					dyn	5–30 ft.	1 00			2 shots.
					dyn	18 ft.	4 00			7 shots.
77	77				12′ Agz.; m. b.	botm.	20	S. 88° W.	1.3	
					K2	10 ft.	20	S. 88° W.	1.3	
					Tnr. sdr. (e)					
78	77				12′ Agz.; m. b.	botm.	5	S. 36° W.	.5	Net slightly torn.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Between Samar and Masbate—Continued.					
			1909.		*fms.*	
D. 5393	Panganalan Pt., Talajit Id., S. 59° E., 14.8 miles (12° 03′ 30″ N., 124° 03′ 36″ E.).	C. S. 4418; Apr., 1906.	Mar. 13	1.44 p. m. 2.04 p. m.	136	hrd. S.
D. 5394	Panalangan Pt., Talajit Id., S. 68° E., 8.1 miles (12° 00′ 30″ N., 124° 05′ 36″ E.).	do	do	2.56 p. m. 3.13 p. m.	153	gn. M.
	Masbate Island.					
....	Port Cataingan	C. S. 4418; Apr., 1906.	Mar. 14	9.00 a. m.		Co.
	Between Samar and Masbate.					
....	Buang B., Talajit Id.	C. S. 4418; Apr., 1906.	Mar. 15	8.00 a. m.		rky.
D. 5395	Panalangan Pt., Talajit Id., S. 81° E., 2.9 miles (11° 56′ 40″ N., 124° 14′ E.).	do	do	8.38 a. m. 8.55 a. m.	140	hrd. gn. M. (m. b.)
D. 5396	Panalangan Pt., Talajit Id., S. 78° E., 4.5 miles (11° 57′ N., 124° 12′ 24″ E.).	do	do	9.30 a. m. 9.45 a. m.	137	hrd. gn. M. (m. b.)
D. 5397	Panalangan Pt., Talajit Id., S. 78° E., 6 miles (11° 57′ 27″ N., 124° 10′ 42″ E.).	do	do	10.21 a. m. 10.36 a. m.	134	gn. M.
	Between Masbate and Leyte.					
....	Gigantangan Id. (west)	C. S. 4418; Apr, 1906.	Mar. 15	3.00 p. m.		limestone.
D. 5398	Gigantangan Id. (S.), S. 45° E., 2.7 miles (11° 35′ 12″ N., 124° 13′ 48″ E.).	do	do	3.03 p. m. 3.21 p. m.	114	gn. M.
	North of Cebu.					
....	Malapascua Id. (west)	C. S. 4718; Dec., 1906.	Mar. 16	6.00 a. m.		R., Co.
D. 5399	Tanguingui Id. Lt., N. 70° W., 22.8 miles (11° 21′ 45″ N., 124° 05′ E.).	do	do	8.54 a. m. 9.01 a. m.	32	S., Sh.
D. 5400	Tanguingui Id. Lt., N. 77° W., 22.5 miles (11° 24′ 24″ N., 124° 05′ 30″ E.).	do	do	9.34 a. m. 9.50 a. m.	25	S., Sh.
D. 5401	Tanguingui Id. Lt., N. 79° W., 23 miles (11° 24′ 45″ N., 124° 06′ E.).	do	do	9.58 a. m. 10.05 a. m.	30	fne. S.
	Between Leyte and Cebu.					
D. 5402	Capitancillo Id. Lt., S. 37° W., 16.1 miles (11° 11′ 45″ N., 124° 15′ 45″ E.).	C. S. 4718; Dec., 1906.	Mar. 16	1.54 p. m. 2.16 p. m.	188	gn. M.
....	Calangaman Id. (north)	do	do	2.30 p. m.		sctd. Co., R.
D. 5403	Capitancillo Id. Lt., S. 46° W., 15.7 miles (11° 10′ N., 124° 17′ 15″ E.).	do	do	2.56 p. m. 3.14 p. m.	182	gn. M.
	Dupon Bay (Leyte) and vicinity.					
....	Sacaysacay Pt.	C. S. 4426; May, 1904.	Mar. 17	8.30 a. m.		Co.
....	Guint River	do	do	8.30 a. m.		
D. 5404	Ponson Id. (N.), S. 79° E., 6.8 miles (10° 50′ N., 124° 26′ 18″ E.).	do	do	8.37 a. m. 8.58 a. m.	190	M.
D. 5405	Ponson Id. (N.), S. 86° E., 8.5 miles (10° 49′ 20″ N., 124° 24′ 23″ E.).	do	do	9.46 a. m. 10.09 a. m.	262	hrd.
D. 5406	Ponson Id. (N.), S. 88° E., 10.2 miles (10° 49′ 03″ N., 124° 22′ 30″ E.).	do	do	11.13 a. m. 11.41 a. m.	298	M.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Tnr. sdr. (e)					
82	78				12′ Agz.; m. b.	botm	8	S. 11° W.	1.0	
					Tnr. sdr. (e)					
80	78				12′ Agz.; m. b	botm	9	S. 41° W.	1.1	
					dyn	12 ft	2 00			4 shots.
					dyn	18-30 ft.	4 00			15 shots.
					Luc. sdr. (e)					
79	78		1.02466		12′ Agz.; m.b.	botm	19	N. 75° W.	1.2	
					K. 2	surface.	19	N. 75° W.	1.2	
					Luc. sdr. (e)					
79	79				12′ Agz; m. b.	botm	20	N. 66° W.	1.5	
					K. 2	surface.	20	N. 66° W.	1.5	
					Luc. sdr. (e)					
79	79				12′ Agz.; m. b.	botm	16	N. 69° W.	1.2	
					K. 2	surface.	16	N. 69° W.	1.2	
					dyn	12-15 ft.	1 00			3 shots.
					Tnr. sdr. (e)					
81	80				12′ Agz.; m. b.	botm	7	N. 49° W.	.5	
					dyn	10-20 ft.	3 30			14 shots.
					Tnr. sdr. (e)					
79	79				6′ McC	botm	9	N. 22° E.	.5	
					Tnr. sdr. (e)					
80	80		1.02458		6′ McC	botm	12	N. 10° E.	.4	
					Tnr. sdr. (e)					
80	80				6′ McC	botm	27	N. 61° E.	.9	
		55.8			Luc. sdr. (a)					
81	81				12′ Agz.; m. b.	botm	22	S. 45° E.	1.9	
					K. 2	surface.	22	S. 45° E.	1.9	
					dyn	8-25 ft.	2 00			7 shots.
		55.7			Luc. sdr. (a)					
81	81				12′ Agz	botm	29	S. 55° E.	1.8	
					dyn	12-30 ft.	7 30			16 shots.
					dyn		7 00			
		55.4			Luc. sdr. (a)					
81	78				12′ Agz	botm	26	S. 74° W.	1.8	
					Luc. sdr. (e)					
82	80				12′ Agz	botm	20	S. 82° W.	1.9	
					Luc. sdr. (e)					
83	81				12′ Agz	botm	27	N. 81° W.	2.0	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Dupon Bay (Leyte) and vicinity—Continued.					
			1909.		*fms.*	
D. 5407	Ponson Id. (N.), S. 76° E., 12.2 miles (10° 51′ 38″ N. 124° 20′ 54″ E.).	C. S. 4426; May, 1904.	Mar. 17	12.57 p. m. 1.28 p. m.	350	gn. M
....	Anchorage, Dupon Bay	....do	...do	7.00 p. m.		
	Between Cebu and Leyte.					
D. 5408	Capitancillo Lt., N. 25° W., 20.8 miles (10° 40′ 15″ N., 124° 15′ E.).	C. S. 4718; Dec., 1906.	Mar. 18	8.05 a. m. 8.23 a. m.	159	gn. M
D. 5409	Capitancillo Lt., N. 19° W., 22 miles (10° 38′ N., 124° 13′ 08″ E.).	....do	...do	9.16 a. m. 9.51 a. m.	189	gn. M
D. 5410	Bagacay Pt. Lt., S. 37° W., 7.2 miles (10° 28′ 45″ N., 124° 05′ 30″ E.).	....do	...do	11.21 a. m. 11.56 a. m.	385	gn. M
	Between Cebu and Bohol.					
D. 5411	Lauis Pt. Lt., N. 35° E., 4.7 miles (10° 10′ 30″ N., 123° 51′ 15″ E.).	C. S. 4718; Dec., 1906.	Mar. 23	8.18 a. m. 8.48 a. m.	145	gn. M
D. 5412	Lauis Pt. Lt., N. 21° E., 5.5 miles (10° 09′ 15″ N., 123° 52′ E.).	....do	...do	9.36 a. m. 9.58 a. m.	162	gn. M
....	Pandanon Id. (south)	....do	...do	2.30 p. m.		Co., S
....	....do	....do	...do	2.30 p. m.		S., Co
....	Reef opposite Pandanon Id.	....do	Mar. 24	7.30 a. m.		Co., S
D. 5413	Lauis Pt. Lt., N. 68° W., 10 miles (10° 10′ 35″ N., 124° 03′ 15″ E.).	....do	...do	11.34 a. m.	*42	
D. 5414	Lauis Pt. Lt., N. 67° W., 9.5 miles (10° 10′ 40″ N., 124° 02′ 45″ E.).	....do	...do	12.04 p. m.		
D. 5415	Lauis Pt. Lt., N. 24° W., 7.2 miles (10° 07′ 50″ N., 123° 57′ E.).	....do	...do	1.21 p. m. 1.41 p. m.	88	fne. S
D. 5416	Lauis Pt. Lt., N. 12° E., 2.9 miles (10° 11′ 30″ N., 123° 53′ 30″ E.).	....do	Mar. 25	7.20 a. m. 7.43 a. m.	150	gn. M
D. 5417	Lauis Pt. Lt., N. 10° E., 3.5 miles (10° 10′ N., 123° 53′ 15″ E.).	....do	...do	8.18 a. m. 8.40 a. m.	165	gy. M., S
D. 5418	Lauis Pt. Lt., N. 16° E., 5.6 miles (10° 08′ 50″ N., 123° 52′ 30″ E.).	....do	...do	9.28 a. m. 9.48 a. m.	159	gy. M., S
D. 5419	Lauis Pt. Lt., N. 27° E., 17.8 miles (9° 58′ 30″ N., 123° 46′ E.)	....do	...do	1.35 p. m. 1.55 p. m.	175	gn. M
D. 5420	Cruz Pt. (Bohol), S. 20° E., 6 miles (9° 49′ 35″ N., 123° 45′ E.)	....do	...do	3.33 p. m. 3.48 p. m.	127	
	Bohol Island.					
....	Maribojoc Bay (anchorage)	C. S. 4718; Dec., 1906.	Mar. 24	7.30 p. m.		
....	Maribojoc Bay (E. of Cruz Pt.)	....do	Mar. 26	6.00 a. m.		Co., R
	Between Panay and Guimaras.					
D. 5421	Lusaran Pt. Lt., S. 27° E., 5 miles (10° 33′ 30″ N., 122° 26′ E.)	C. S. 4718; Dec., 1906.	Mar. 30	5.38 p. m. 6.10 p. m.	137	gn. M
D. 5422	Lusaran Pt. Lt., S. 80° E., 9.7 miles (10° 31′ N., 122° 18′ 45″ E.)	....do	...do	7.17 p. m.		

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Luc. sdr. (e)					
82	81				12′ Agz	botm	20	S. 49° E.	1.6	
					dip; e. l.; dyn. caps.	surface	3 00			2 shots.
		55.4			Luc. sdr. (a)					
83	80		1.02462		12′ Agz.; m. b.	botm	20	S. 46° W.	1.3	
					K. 2	surface	20	S. 46° W.	1.3	
					Luc. sdr. (e)					
81	80				12′ Agz.; m. b.	botm	29	S. 51° W.	2.0	
					K	surface	29	S. 51° W.	2.0	Record incomplete.
					Luc. sdr. (e)					
82	80				12′ Agz.; m. b.	botm	14	S. 3° W.	1.2	
		55.2			Luc. sdr. (e)					
80	81				12′ Agz.; m. b.	botm	24	S. 33° W.	1.7	
					K. 2	surface	24	S. 33° E.	1.7	
		54.8			Luc. sdr. (e)					
81	81				12′ Agz	botm	22	S. 67° E.	1.7	
					dyn	6–12 ft.	2 30			4 shots.
					130′ seine	5 ft	5 30			11 hauls.
					dyn	10–12 ft.	1 00			3 shots.
82	82				6′ McC	botm	6	N. 30° W.	.6	
82	82				6′ McC	botm	9	N. 23° W.	1.2	
		62.4			Luc. sdr. (a)					
83	81				12′ Agz.; m. b.	botm	19	N. 81° W.	1.5	
		54.4			Luc. sdr. (a)					
81	80				12′ Agz	botm	20	South	1.5	
		54.4			Luc. sdr. (a)					
81	80				12′ Agz	botm	20	S. 18° W.	1.2	
		54.4			Luc. sdr. (a)					
81	81				12′ Agz	botm	20	S. 82° W.	.8	
		54.5			Luc. sdr. (a)					
83	81				12′ Agz	botm	20	S. 74° W.	1.3	
		59			Luc. sdr. (a)					
83	81				12′ Agz., m. b.	botm	17	S. 54° W.	1.2	
					dip; e. l.	surface	1 30			
					dyn	10–20 ft.	2 00			6 shots.
		58.4			Luc. sdr. (a)					
84	82				12′ Agz.; m. b.	botm	19	S. 70° W.	1.5	
84	82				int. 3	surface	20	W. by S.	1.5	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Jolo Sea.		1909.		*fms.*	
....	Cagayan Id., Cagayanes Ids. (NW.).	C. S. 4717; Feb.,1903.	Mar. 31	9.00 a. m.	....	mgn. Rf ....
D. 5423	Cagayan Id. (S.), S. 11° E., 4.8 miles (9° 38′ 30″ N., 121° 11′ E.)	.....do......	...do.....	9.16 a. m. 9.55 a. m.	508	gy. M., co. S......
D. 5424	Cagayan Id. (S.), S. 11° W., 3.4 miles (9° 37′ 05″ N., 121° 12′ 37″ E.).	.....do......	...do.....	12.52 p. m. 1.24 p. m.	340	co. S..............
D. 5425	Cagayan Id. (S.), S. 14° E., 4 miles (9° 37′ 45″ N., 121° 11′ E.).	.....do......	...do.....	2.20 p. m. 2.57 p. m.	495	gy. M., co. S......
	Eastern Palawan and vicinity.					
....	Mantaquin Bay (Palawan)..	C. S. 4716; Feb.,1903.	Apr. 1	3.00 p. m.	....	S.................
....	Rasa Id. (southwest)........	.....do......	...do.....	3.00 p. m.	....	sft. Co., R ....
....	Malinao River (Palawan)....	.....do......	Apr. 2	8.00 a. m.	....	....
....	Rasa Id. (southwest)........	.....do......	...do.....	9.00 a. m.	....	Co.................
....	Mantaquin Bay..............	.....do......	...do.....	2.30 p. m.	....	S., G..............
D. 5426	30th of June Id., N. 29° E., 12.2 miles (9° 12′ N., 118° 28′ E.).	.....do......	Apr. 3	6.42 a. m. 6.44 a. m.	27	fne. gy. S..........
D. 5427	30th of June Id., N. 16° W., 11.5 miles (9° 11′ 30″ N., 118° 37′ 08″ E.).	.....do......	...do.....	8.04 a. m. 8.09 a. m.	37	S , Sh.............
D. 5428	30th of June Id., N. 62° W., 19.5 miles (9° 13′ N., 118° 51′ 15″ E.).	.....do......	...do.....	10.14 a. m. 11.23 a. m.	1,105	gy. M..............
H. 4928	Fondeado Id. (SE.), N. 29 E., 23 miles (9° 34′ 48″ N., 118° 45′ E.).	.....do......	...do.....	3.28 p. m.	902	gy. M., fne. co. S ...
H. 4929	Fondeado Id. (SE.), N. 19 E., 19 miles (9° 37′ 30″ N., 118° 48′ 30″ E.).	.....do......	...do.....	4.39 p. m.	554	gy. M..............
....	Iwahig River and tributaries (Pta. Princesa).	C. S. 4343; July, 1903.	Apr. 4	7.00 a. m.	....	....
....	Puerta Princesa (west of Bancaobancaon Pt.).	.....do......	Apr. 5	6.30 a. m.	....	S., R., Co..........
D. 5429	Fondeado Id. (SE.), N. 18 E., 15 miles (9° 41′ 30″ N., 118° 50′ 22″ E.).	C. S. 4716; Feb., 1903.	...do.....	7.32 a. m. 8.14 a. m.	766	gn. M..............
....	Machesi Id. (southwest)......	.....do......	...do.....	1.00 p. m.	....	S., M., Co.........
D. 5430	Fondeado Ids. (W.), N. 57° W., 10.5 miles (9° 49′ 40″ N., 119° 03′ 20″ E.).	.....do......	Apr. 6	10.07 a. m. 10.54 a. m.	464	glob. Oz...........
....	Verde del Sur Id. (south)....	.....do......	...do.....	2.00 p. m.	....	Co., G., S..........
....	.....do......................	.....do......	...do.....	2.00 p. m.	....	S..................
....	.....do......................	.....do......	...do.....	8.00 p. m.	....	....
....	Port Langcan, Dumaran Id. (east).	.....do......	Apr. 7	4.00 p. m.	....	R., Co.............
....	.....do......................	.....do......	...do.....	5.30 p. m.	....	....
....	Port Langcan, Dumaran Id. (anch.).	.....do......	...do.....	7.30 p. m.	....	....
....	Port Langcan, Dumaran Id. (Green Pt.).	.....do......	Apr. 8	7.00 a. m.	....	S., Co., G..........
....	Wreck Bay, Dalaganem Id..	C. S. 4717; Feb., 1903.	...do.....	2.30 p. m.	....	R., S., Co..........
D. 5431	Corandagos Id. (NW.), N. 28° E., 4.8 miles (10° 38′ 45″ N., 120° 12′ 45″ E.).	.....do......	...do.....	2.49 p. m. 2.54 p. m.	51	S..................
D. 5432	Corandagos Id. (NW.), N. 30° E., 5.7 miles (10° 37′ 50″ N., 120° 12′ E.).	.....do......	...do.....	3.26 p. m. 3.34 p. m.	51	S..................
D. 5433	Corandagos Id. (NW.), N. 35° E., 6.5 miles (10° 37′ 30″ N , 120° 11′ 05″ E.).	.....do......	...do.....	4.04 p. m. 4.16 p. m.	54	gn. M., co. S ......
D. 5434	Corandagos Id. (N.), S. 63° W., 7.6 miles (10° 46′ 45″ N., 120° 22′ 45″ E.).	.....do......	...do.....	7.50 p. m.	....	....

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
....	....	......	....	....	dyn	2-50 ft.	3 00	....	....	6 shots.
....	....	49.8	....	....	Luc. sdr. (a)	....	.....	....	....	
82	82	......	....	....	12′ Agz.; m. b.	botm.	27	N. W.	1.5	
....	....	50.4	....	....	Luc. sdr. (a)	....	.....	....	....	
81	82	......	....	....	12′ Agz.; m. b.	botm.	20	N. 67° W.	1.5	
....	....	49.4	....	....	Luc. sdr. (a)	....	.....	....	....	
82	83	......	....	....	12′ Agz.; m. b.	botm.	20	N. 62° W.	1.2	
....	....	......	....	....	130′ seine	4 ft.	2 00	....	....	6 hauls.
....	....	......	....	....	dyn	6-12 ft.	2 00	....	....	8 shots.
....	....	......	....	....	dyn	....	4 00	....	5.0	
....	....	......	....	....	dyn	8-10 ft.	3 00	....	....	4 shots.
....	....	......	....	....	500′ seine	10 ft.	2 30	....	....	3 hauls.
....	....	......	....	....	Tnr. sdr. (e)	....	.....	....	....	
81	82	......	....	....	6′ McC.	botm.	9	N. 20° E.	.3	
....	....	......	....	....	Tnr. sdr. (e)	....	.....	....	....	
81	82	......	....	....	6′ McC.	botm.	5	....	....	Net lost.
....	....	49.7	....	....	Luc. sdr. (a)	....	.....	....	....	
85	83	......	....	....	12′ Agz.; m. b.	botm.	21	N. by W.	1.0	
86	83	49.4	....	....	Luc. sdr. (a)	....	.....	....	....	
83	82	49.4	....	....	Luc. sdr. (a)	....	.....	....	....	
....	....	......	....	....	dyn	....	12 00	....	....	
....	....	......	....	....	dyn	4-20 ft.	2 30	....	....	6 shots.
....	....	......	....	....	Luc. sdr. (a)	....	.....	....	....	
82	83	......	....	....	12′ Agz.; m. b.	botm.	18	N. 73° W.	1.9	
....	....	......	....	....	dyn	6-12 ft.	4 00	....	....	10 shots.
....	....	50	....	....	Luc. sdr. (a)	....	.....	....	....	
84	83	......	....	....	12′ Agz.	botm.	25	N.	1.5	
....	....	......	....	....	K. 2	surface.	25	N.	1.5	
....	....	......	....	....	dyn	8-10 ft.	3 00	....	....	6 shots.
....	....	......	....	....	130′ seine	2-4 ft.	3 00	....	....	20 hauls.
....	....	......	....	....	gill nets	....	12 00	....	....	2 lines.
....	....	......	....	....	dyn	6-15 ft.	1 30	....	....	5 shots.
....	....	......	....	....	gill nets	....	12 00	....	....	2 lines.
....	....	......	....	....	dip; e. l.	surface.	20	....	....	
....	....	......	....	....	dyn	8 ft.	4 30	....	....	17 shots.
....	....	......	....	....	dyn	12-18 ft.	3 00	....	....	6 shots.
....	....	......	....	....	Tnr. sdr. (e)	....	.....	....	....	
84	83	......	....	....	6′ McC.	botm.	20	S. 46° W.	.8	
84	83	......	....	....	Tnr. sdr. (e)	....	.....	....	....	
....	....	......	....	....	6′ McC.	botm.	20	S. 68° W.	1.3	
....	....	......	....	....	Tnr. sdr. (e)	....	.....	....	....	
83	83	......	....	....	6′ McC.	botm.	20	S. 44° W.	1.2	
83	83	......	....	....	int. 3	surface.	20	N. 70° E.	.2	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Cuyos Islands.		1909.		*fms.*	
....	Cuyo Id. (west).............	C. S. 4345; Feb., 1905.	Apr. 9	8.30 a. m.	....	R., Co...........
....	.....do....................	....do......	...do.....	8.30 a. m.	....	S.................
....	Bisucay Id. (northeast)......	....do......	...do.....	2.00 p. m.	....	Co., R............
D. 5435	Bisucay Id. (NE.), S. 55° E., 1 mile (10° 50′ N., 120° 58′ 10″ E.).	C. S. 4717; Feb., 1903.	...do.....	7.50 p. m.	....	....
	West coast of Luzon, Manila Bay to Lingayen Gulf.					
D. 5436	Corregidor Lt., N. 83° E., 5.2 miles (14° 22′ 37″ N., 120° 29′ E.).	C. S. 4240; Feb., 1907.	May 7	7.03 p. m.	*32	....
....	Hermana Mayor Id. (west)..	C. S. 4712; Sept., 1904.	May 8	9.00 a. m.	....	S., Co............
....	Caiman Cove...............	C. S 4210; Sept., 1907.	...do.....	3.30 p. m.	....	S., Co., R........
....	.....do....................	.....do.....	...do.....	7.00 p. m.	....	M.................
D. 5437	Hermana Mayor Lt., N. 69° E., 4.9 miles (15° 45′ 54″ N. 119° 42′ 45″ E.).	.....do.....	...do.....	10.27 a. m. 12.07 p. m.	....	....
D. 5438	Hermana Mayor Lt., S. 21° E., 7.5 miles (15° 54′ 42″ N., 119° 44′ 42″ E.).	.....do.....	...do.....	3.50 p. m. 4.20 p. m.	297	gn. M.............
....	Caiman Cove................	.....do.....	May 9	6.00 a. m.	....	S., Co............
D. 5439	Hermana Mayor Lt., S. 33° E., 12.6 miles (15° 58′ 15″ N., 119° 40′ 20″ E.).	.....do.....	...do.....	9.44 a. m. 10.49 a. m.	940	gn. M.............
....	Bolinao Bay (north of Bolinao).	C. S. 4238; Feb., 1905.	...do.....	8.00 p. m.	....	....
....	Bolinao Bay (east of village).	.....do.....	May 10	6.00 a. m.	....	S., Co., R........
....	.....do....................	.....do.....	...do.....	8.00 a. m.	....	S.................
D. 5440	S. Fernando Pt. Lt., N. 82° E., 23.1 miles (16° 33′ 52″ N., 119° 52′ 54″ E.).	C. S. 4209; Oct., 1905.	...do.....	1.35 p. m. 2.01 p. m.	172	fne. gy. S., Glob..
D. 5441	S. Fernando Pt. Lt., S. 87° E, 18.7 miles (16° 38′ N., 119° 57′ 18″ E.).	.....do.....	...do.....	3.20 p. m. 3.47 p. m.	186	....
D. 5442	S. Fernando Pt. Lt., N. 39° E., 8.4 miles (16° 30′ 36″ N., 120° 11′ 06″ E.).	.....do.....	...do.....	6.48 p. m. 6.58 p. m.	45	co. S.............
....	Lingayen G. (east of Pt. Guecet).	.....do.....	May 11	10.00 a. m.	....	S.................
	East coast of Luzon, San Bernardino Strait to San Miguel Bay.					
....	Matnog Bay................	C. S. 4258; Jan., 1903.	May 31	2.00 p. m.	....	Co., R............
....	.....do....................	.....do.....	...do....	2.00 p. m.	....	S., Co............
....	.....do....................	.....do.....	...do.....	6.00 p. m.	....	....
....	Balicuatro Ids., Biri Channel (southern Biri Id.).	C. S. 4220; May, 1907.	June 1 June 2	8.00 a. m. 7.00 p. m. 6.00 a. m.	....	mgn. Rf........... .... mgn. Rf...........
....	Batag Id. (west, near Leung Pt.).	C. S. 4449; Jan., 1907.	...do..... June 3	4.00 p. m. 5.00 p. m. 8.00 a. m.	....	Co., co. R........ .... Co................
D. 5443	Atalaya Pt., Batag Id., S. 64° E., 3.6 miles (12° 43′ 05″ N., 125° 01′ E.).	.....do.....	...do.....	8.50 a. m. 9.19 a. m.	241	co. S., Sh........
D. 5444	Atalaya Pt., Batag Id., S. 65° E., 5.1 miles (12° 43′ 51″ N., 124° 58′ 50″ E.).	.....do.....	...do.....	9.57 a. m. 10.32 a. m.	308	gn. M.............
D. 5445	Atalaya Pt., Batag Id., S. 56° E., 5.3 miles (12° 44′ 42″ N., 124° 59′ 50″ E.).	.....do.....	...do.....	11.25 a. m. 12.01 p. m.	383	gn. M., S.........

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dyn.	4-16 ft.	3 0			7 shots.
					130′ seine.	3-4 ft.	2 30			10 hauls.
					dyn.	6-18 ft.	3 00			9 shots.
83	83				int. 3.	surface.	21	W. x N.	0.7	
85	86				int. 4.	surface.	15	W.	.5	
					dyn.	8-10 ft.	5 00			5 shots.
					dyn.	5-12 ft.	2 00			4 shots.
					2 gill nets.	9 fms.	11 00			
88	86				6 K. 6.	100-600 fms.	36	N. 61° W.	.9	
87	86				Int. 4 §.	450 fms.	27 22			
		46.2			Luc. sdr. (a).					
87	87				12′ Agz.; m. b.	botm.	21	S. 5° E.	1.2	
					dyn.	10-12 ft.	2 00			8 shots.
		36.7			Luc. sdr. (a).					
89	87				12′ Agz.; m. b.	botm.	14	N. 16° W.	2.5	Net slightly torn.
					dip; e. l.	surface.	1 00			
					dyn.	10-12 ft.	4 00			7 shots.
					130′ seine.	4 ft.	3 00			5 hauls.
		53.2			Luc. sdr. (a).					
86	87				12′ Agz.; m, b.	botm.	20	N. 22° E.	1.8	
		52.2			Luc. sdr. (a).					
86	87				25′ Agz.	botm.	20	N. 64° E.	1.8	
					Tnr. sdr. (e).					
82	85				25′ Agz.	botm.	10 34	S. 12° E.	15.5	
					500′ seine.	4-12 ft.	4 30			5 hauls.
					dyn.	10-12 ft.	3 00			5 shots.
					430′ seine.	5 ft.	2 30			3 hauls.
					3 gill nets.		12 00			
					dyn.	12-24 ft.	7 00			13 shots.
					3 gill nets.		12 00			
					dyn.	10-12 ft.	3 00			7 shots.
					dyn.	6-15 ft.	1 30			6 shots.
					3 gill nets.		13 00			
					dyn.	5-15 ft.	7 30			17 shots.
		51.3			Luc. sdr. (a).					
82	83				12′ Agz.	botm.	20	N. 70° W.	1.9	
		45.3			Luc. sdr. (a).					
85	83				12′ Agz.	botm.	17	N. 65° E.	1.1	
		44.3			Luc. sdr. (a).					
85	83				12′ Agz.	botm.	37	S. 73° E.	1.5	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	East coast of Luzon, San Bernardino Strait to San Miguel Bay—Continued.					
			1909.		*fms.*	
D. 5446	Atalaya Pt., Batag Id., S. 64° E., 5.3 miles (12° 43′ 51″ N., 124° 59′ 18″ E.).	C. S. 4449; Jan., 1907.	June 3	1.25 p. m. 1.58 p. m.	300	gn. M
D. 5447	S. Miguel Pt., S. 7° W., 3.5 miles (13° 28′ N., 123° 46′ 18″ E.)	C. S. 4221; June, 1905.	June 4	5.37 a. m. 6.14 a. m.	310	gn. M
	Tabaco Bay (west of S. Miguel Pt.).	C. S. 4237; Mar., 1905.	...do	8.00 a. m.		co. S
D. 5448	S. Miguel Pt., N. 23° E., 1.5 miles (13° 23′ 10″ N., 123° 45′ 19″ E.).	...do	...do	8.55 a. m.	*47	
	Batan Id. (north, west of Camisog Pt.).	C. S. 4259; Aug., 1906.	...do	1.00 p. m.		S., Co
D. 5449	East Pt. (Batan Id.), S. 43° E., 7.9 miles (13° 21′ 36″ N., 124° 00′ 30″ E.).	C. S. 4221; June, 1905.	...do	2.38 p. m.	*300	
D. 5450	East Pt. (Batan Id.), S. 36° E., 9.2 miles (13° 23′ 15″ N., 124° 00′ 30″ E.).	...do	...do	3.19 p. m. 3.52 p. m.	408	gn. M., Co
D. 5451	East Pt. (Batan Id.), S. 38° E., 8.2 miles (13° 22′ 22″ N., 124° 00′ 48″ E.).	...do	June 5	7.34 a. m.	*380	
	Batan Id. (southwest, of Batan).	C. S. 4259; Aug., 1906.	...do	8.00 a. m. 1.00 p. m.		S., Co tide pools
	Rapurapu Id. (Babayon Pt.).	...do	...do	1.00 p. m.		Co
	Albay G., Yaua River	C. S. 4237; Mar., 1905.	June 7	6.00 a. m.		
D. 5452	Legaspi Lt., S. 38° W., 3 miles (13° 11′ 54″ N., 123° 47′ 10″ E.).	C. S. 4221; June, 1905.	...do	8.51 a. m.	*110	
D. 5453	Legaspi Lt., S. 58° W., 4.5 miles (13° 12′ N., 123° 49′ 18″ E.).	...do	...do	9.44 a. m.	*146	
D. 5454	Legaspi Lt., S. 64° W., 5.7 miles (13° 12′ N., 123° 50′ 30″ E.).	...do	...do	10.46 a. m.	*153	
D. 5455	Legaspi Lt., S. 70° W., 6.7 miles (13° 11′ 51″ N., 123° 51′ 42″ E.).	...do	...do	11.57 a. m.	*165	
D. 5456	Legaspi Lt., S. 76° W., 6.7 miles (13° 11′ 10″ N., 123° 51′ 52″ E.).	...do	...do	12.55 p. m.	*142	
D. 5457	Legaspi Lt., S. 60° W., 5 miles (13° 12′ N., 123° 49′ 40″ E.).	...do	June 8	9.40 a. m.	*146	
	Batan Id., Caracaran Bay	C. S. 4259; Aug., 1906.	...do	1.00 p. m.		S., Co
D. 5458	Legaspi Lt., S. 84° W., 14 miles (13° 10′ 54″ N., 123° 59′ 38″ E.).	C. S. 4221; June, 1905.	...do	2.04 p. m.	*200	
D. 5459	Legaspi Lt., S. 88° W., 14.3 miles (13° 10′ 21″ N., 123° 59′ 54″ E.).	...do	...do	3.41 p. m.	*201	
	Catanduanes Id., Cabugao Bay (east).	C. S. 4269; Feb., 1909.	June 9	9.00 a. m.		R., Co., grass
	Catanduanes Id., Cabugao River.	...do	...do	9.00 a. m.		
	Catanduanes Id., Cabugao Bay.	...do	...do	7.00 p. m.		
	Catanduanes Id., Agojo Pt.	C. S. 4222; Jan., 1909.	June 10	8.30 a. m.		co. S
D. 5460	Sialat Pt. Lt., N. 24° E., 8.2 miles (13° 32′ 30″ N., 123° 58′ 06″ E.).	...do	...do	8.37 a. m. 9.22 a. m.	565	gy. M
	Palumbanes Ids., Porongpong Id. (southwest).	...do	...do	3.00 p. m.		S., Co

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Luc. sdr. (a)					Therm. failed to register.
84	83				12′ Agz.	botm.	28	S. 83° E.	1.6	
		45.3			Luc. sdr. (a)					
83	85				12′ Agz.	botm.	21	N. 64° E.	1.5	
					dyn.	10-15 ft.	3 00			7 shots.
86	86				12′ Agz.; m. b.	botm.	21	S. 64° E.	.8	
					dyn.	8-10 ft.	4 30			6 shots.
85	86				12′ Agz.; m. b.	botm.	21	N.	1.4	
		42.3			Luc. sdr. (a)					
85	86				12′ Agz.; m. b.	botm.	28	N.	1.9	
79	84				int. 5 §	280 fms.	21 12	S. 61° E.	1.0	
					dyn.	10 ft.	8 00			10 shots.
					copper sulp'te.		2 00			
					dyn.	8-12 ft.	4 30			4 shots.
					25′ seine; dyn.		9 30			
85	85				12′ Agz.	botm.	14	N. 48° E.	1.0	
85	86				12′ Agz.	botm.	20	E.	1.1	
86	86				12′ Agz.	botm.	21	S. 79° E.	1.2	
86	86				12′ Agz.	botm.	14	S. 63° E.	1.1	
87	86				int. 4 §	120 fms.	19 7	N. 88° W.	1.3	
85	85				12′ Agz.	botm.	20	S. 72° E.	1.4	
					dyn.	6-10 ft.	3 30			13 shots.
87	85				12′ Agz.	botm.	23	S. 56° E.	.6	
85	85				12′ Agz.; m. b.	botm.	20	N. 86° W.	.8	
					dyn.	10-18 ft.	2 30			6 shots.
					dyn.; 25′ seine.		8 00			
					dip; e. l.	surface.	1 30			
					dyn.	12 ft.	2 30			13 shots.
					Luc. sdr. (a)					Therm. failed to register.
86	85				12′ Agz.; m. b.	botm.	14	N. 43° W.	2.0	
					dyn.	8-20 ft.	2 30			5 shots.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	East coast of Luzon, San Bernardino Strait to San Miguel Bay—Continued.		1909.		*fms.*	
	Palumbanes Ids., "West Id." (west).	C. S. 4222; Jan., 1909.	June 11	7.00 a. m.		co. R
	Lahuy Id., Pocket Bay (west).	do	do	1.00 p. m.		co. S
	Quinalasag Id., Masamat Bay.	do	do	7.00 p. m.		
	Quinalasag Id., Masamat Bay (east).	do	June 12	6.00 a. m.		S., Co
	Butauanan Id. (west and south).	C. S. 4223; June, 1908.	do	2.30 p. m.		S., Co
	Butauanan Id. (south)	do	June 13	6.30 a. m.		Co., S
	Maculabo Id. (west)	C. S. 4715; Apr., 1907.	do	3.30 p. m. 7.30 p. m.		Co
	do	do	June 14	6.30 a. m. 9.00 a. m.		Co. tide pools
	S. Miguel Bay, Colasi Pt.	C. S. 4223; June, 1908.	do	7.00 p. m.		
D. 5461	Caringo Id. (W.), N. 12° W., 4.9 miles (13° 57′ 42″ N., 123° 06′ 42″ E.).	do	do	7.10 p. m.	11	
	Canimo Pass, Daet Pt	do	June 15	9.00 a. m.		Co., S.
	Canimo Pass, Basut River	do	do	9.00 a. m.		
D. 5462	Sialat Lt., S. 80° E., 5 miles (13° 40′ 42″ N., 123° 56′ 30″ E.).	C. S. 4222 Jan., 1909.	June 16	5.50 a. m. 6.44 a. m.	469	gy. M.
	Lagonoy G., Palag Bay (east)	do	do	9.00 a. m.		Co., R.
D. 5463	Sialat Pt. Lt., S. 74° E., 3.9 miles (13° 40′ 57″ N., 123° 57′ 45″ E.).	do	do	10.28 a. m.	*300	S.*
D. 5464	Sialat Pt. Lt., N. 82° E., 4.4 miles (13° 39′ 15″ N., 123° 57′ 15″ E.).	do	do	2.14 p. m.	*400	
	Lagonoy G., Alto Pt. anch.	do	do	7.30 p. m.		
	Lagonoy G., Rosa Id.	do	do	7.30 a. m.		S., Co.
	Lagonoy G., Bato River	do	June 17	7.30 a. m.		
D. 5465	Atulayan Id. (E.), S. 50° W., 7.3 miles (13° 39′ 42″ N., 123° 40′ 39″ E.).	do	do	8.39 a. m.	*500	gy. M. (m. b.)
D. 5466	Atulayan Id. (E.), S. 62° W., 7.7 miles (13° 38′ 36″ N., 123° 41′ 45″ E.).	do	do	10.40 a. m.	*540	gy. M. (m. b.)
	Lagonoy G., Atulayan Bay (south).	do	do	3.00 p. m.		S., R.
	Lagonoy G., Atulayan Bay (west).	do	do	6.30 p. m.		
	Lagonoy G., Atulayan Bay (anch.).	do	do	8.00 p. m.		
	Lagonoy G., Nato River	do	June 18	6.30 a. m.		
	Lagonoy G., Atulayan Id. (east).	do	do	7.00 a. m.		Co., S
D. 5467	Atulayan Id. (S.), S. 79° W., 2.5 miles (13° 35′ 27″ N., 123° 37′ 18″ E.).	do	do	7.52 a. m.	*480	gy. M. (m. b.)
D. 5468	Atulayan Id. (S.), S. 83° W., 5.7 miles (13° 35′ 39″ N., 123° 40′ 28″ E.).	do	do	9.58 a. m.	*569	gn. M. (m. b.)
D. 5469	Atulayan Id. (E.), S. 63° W., 4 miles (13° 36′ 48″ N., 123° 38′ 24″ E.).	do	do	1.29 p. m.	*500	gn. M. (net)
D. 5470	Atulayan Id. (E.), S. 68° W., 6.7 miles (13° 37′ 30″ N., 123° 41′ 09″ E.).	do	do	3.26 p. m.	*560	M.*
	Lagonoy G., Nato anch.	do	do	7.30 p. m.		
D. 5471	Sialat Pt. Lt., N. 71° E., 15 miles (13° 34′ 57″ N., 123° 47′ 06″ E.).	do	June 19	9.17 a. m.	*568	
D. 5472	Sialat Pt. Lt., N. 63° E., 13.6 miles (13° 33′ 36″ N., 123° 49′ E.).	do	do	11.12 a. m.	*550	

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dyn.	8-10 ft.	2 00			3 shots.
					dyn.	12-15 ft.	3 00			2 shots.
					dip; e. l.	surface.	1 00			
					dyn.	10 ft.	3 30			10 shots.
					dyn.	8 ft.	3 00			9 shots.
					dyn.	10 ft.	4 30			11 shots.
					dyn.	15-25 ft.	1 30			7 shots.
					dip; e. l.	surface.	1 30			
					dyn.	8-18 ft.	4 30			11 shots.
					copper sulphate.		2 00			
					4 gill nets.		12 00			
84	86				25′ Agz.	botm.	17	E.	2.5	
					dyn.	5-10 ft.	2 45			5 shots.
					small seines.		10 00		6.0	
		41.3			Luc. sdr. (a).					
83	85				25′ Agz.	botm.	17	S. 35° E.	1.5	Bridle stops and one preventer carried away.
					dyn.	8-25 ft.	5 30			24 shots.
83	84				12′ Agz.; m. b.	botm.	16	S. 82° W.	.8	
84	85				12′ Agz.; m. b.	botm.	10	S. 40° W.	.2	Bridle stops carried away; net badly torn.
					dip; e. l.	surface.	1 00			
					dyn.	8-10 ft.	4 30			6 shots.
					dyn.		4 30		1.5	
83	84				12′ Agz.; m. b.	botm.	20	S. 59° E.	1.6	
84	86				12′ Agz.; m. b.	botm.	22	S. 63° E.	1.6	
					130′ seine, 2 wings.	15 ft.	2 30			3 hauls.
					4 gill nets.		11 00			
					dip; e. l.	surface.	1 00			
					25′ seine.		11 00		4.5	
					dyn.	8-10 ft.	5 00			10 shots.
83	85				12′ Agz.; m. b.	botm.	42	N. 89° E.	2.7	
85	86				12′ Agz.; m. b.	botm.	33	E.	2.1	
84	86				12′ Agz.	botm.	42	N. 86° E.	2.8	
84	86				12′Agz.	botm.	34	S. 50° E.	1.6	
					dip; e. l.	surface.	1 00			
80	84				12′ Agz.	botm.	29	S. 60° E.	2.1	
83	85				12′Agz.	botm.	25	S. 62° E.	1.7	Bridle stops and lashing carried away; load lost.

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	East coast of Luzon, San Bernardino Strait to San Miguel Bay—Continued.					
			1909.		*fms.*	
D. 5473	East Pt. (Batan), S. 20° E., 8.9 miles (13° 24′ 15″ N., 124° 02′ 48″ E.).	C. S. 4221; June, 1905.	June 19	2.05 p. m. 2.49 p. m.	545	gy. M., S.
	Albay G., between Paron and Jesus Pt.	...do...	June 21	1.00 p. m.		Co.
	Batan Id., East Pt.	C. S. 4259; Aug., 1906.	June 22	8.00 a. m.		Co., S
	Rapurapu Id.	...do...	...do...	1.00 p. m.		S., Co.
	Batan Id., Batan anch.	...do...	...do...	8.00 p. m.		
	Port Gubat (Luzon).	C. S. 4258; Jan., 1903.	June 23	1.00 p. m.		Co., S
D. 5474	S. Bernardino Lt., S. 6° W., 8.4 miles (12° 53′ 48″ N., 124° 18′ E.).	C. S. 4220; May, 1907.	June 24	7.18 a. m. 7.37 a. m.	124	Co.
D. 5475	S. Bernardino Lt., S. 27° W., 11 miles (12° 55′ 26″ N., 124° 22′ 12″ E.).	...do...	...do...	8.51 a. m. 9.15 a. m.	195	Sh.
D. 5476	S. Bernardino Lt., S. 37° W., 13.5 miles (12° 56′ 24″ N., 124° 25′ 24″ E.).	...do...	...do...	10.29 a. m. 11.02 a. m.	270	fne. S.
	Langao Pt. (extreme southern Luzon).	...do...	...do...	3.30 p. m.		Co.
	Between Samar and Leyte, vicinity of Surigao Strait.					
	Bito Lake and River (Leyte).	C. S. 4423; June, 1905.	July 26	5.30 a. m.		
	Abuyog (Leyte).	...do...	...do...	8.00 a. m.		S.
H. 4930	Tacbuc Pt. (Leyte), S. 81° W., 16 miles (10° 46′ 24″ N., 125° 17′ 33″ E.).	...do...	July 27	7.02 a. m.	93	S.
H. 4931	Pagbabacnan Pt. (Malhon Id.), S. 79° E., 16.5 miles (10° 45′ 10″ N., 125° 27′ 48″ E.).	...do...	...do...	8.12 a. m.	63	crs. S., Sh.
	Casogoran (Malhon Id.).	...do...	...do...	10.30 a. m.		S., Co.
	Gigoso Pt., Quinapundan Bay (Samar).	...do...	July 28	11.00 a. m.		S., Co.
	San Roque (Leyte).	C. S. 4719; Aug., 1907.	July 29	9.30 a. m.		Co., S.
H. 4932	Tacbuc Pt. (Leyte), N. 79° W., 9.5 miles (10° 42′ 10″ N., 125° 10′ 36″ E.).	...do...	...do...	10.02 a. m.	44	gy. M.
D. 5477	Tacbuc Pt. (Leyte), S. 87° W., 11 miles (10° 44′ 45″ N., 125° 12′ 30″ E.).	...do...	...do...	10.23 a. m. 10.33 a. m.	48	gy. M.
D. 5478	Tacbuc Pt. (Leyte), S. 80° W., 15.2 miles (10° 46′ 24″ N., 125° 16′ 30″ E.).	C. S. 4423; June, 1905.	...do...	11.33 a. m. 11.44 a. m.	57	Sh.
D. 5479	Tacbuc Pt. (Leyte), S. 78° W., 16.5 miles (10° 47′ 15″ N., 125° 17′ 50″ E.).	...do...	...do...	1.02 p. m. 1.16 p. m.	62	gy. M.
D. 5480	Tacbuc Pt. (Leyte), S. 87° W., 17.3 miles (10° 44′ 36″ N., 125° 19′ E.).	...do...	...do...	2.03 p. m. 2.12 p. m.	62	fne. S.
	Hinunangan Bay (Leyte).	C. S. 4719; Aug., 1907.	July 30	7.30 a. m.		Co., S.
D. 5481	Cabugan Grande Id. (N.), N. 86° W., 3.8 miles (10° 27′ 30″ N., 125° 17′ 10″ E.).	...do...	...do...	8.18 a. m. 8.28 a. m.	61	S., Sh., G.
D. 5482	Cabugan Grande Id. (N.), N. 87° W., 4.5 miles (10° 27′ 30″ N., 125° 18′ E.).	...do...	...do...	8.56 a. m. 9.11 a. m.	67	brk. Sh., S., gn. M.
D. 5483	Cabugan Grande Id. (N.), N. 88° W., 5.7 miles (10° 27′ 30″ N., 125° 19′ 15″ E.).	...do...	...do...	9.48 a. m. 10.00 a. m.	74	S., brk. Sh.
D. 5484	Cabugan Grande Id. (N.), S. 88° W., 6.4 miles (10° 28′ N., 125° 20′ E.).	...do...	...do...	10.33 a. m. 10.44 a. m.	76	S., brk. Sh.
H. 4933	Cabugan Grande Id. (N.), N. 70° W., 9.1 miles (10° 24′ 37″ N., 125° 22′ 15″ E.).	...do...	...do...	12.02 p. m.	90	gn. M., S., brk. Sh.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F	°F.					h. m.		mi.	
		40.3			Luc. sdr. (a)					
85	86				12′ Agz.	botm.	15	S. 41° E.	1.2	Bridle stops carried away.
					dyn.	10 ft.	4 00			12 shots.
					dyn.	7–12 ft.	3 30			5 shots.
					dyn.	10–15 ft.	5 00			14 shots.
					dip; e. l.		1 00			
					dyn.	8–15 ft.	4 00			11 shots.
					Tnr. sdr. (e)					
82	82				12′ Agz.	botm.	16	S. 58° W.	.8	
		59.3			Luc. sdr. (a)					
85	82				12′ Agz.	botm.	16	N. 82° W.	1.2	
		48.3			Luc. sdr. (a)					
84	83				12′ Agz.	botm.	26	N. 84° W.	1.0	
					dyn.	6–15 ft.	2 00			8 shots.
					dyn., sml. seines.		12 00		4.0	
					130′ seine.	12 ft.	4 00			3 hauls.
					Tnr. sdr. (e)					
					Tnr. sdr. (e)					
					dyn.	9–18 ft.	6 00			18 shots.
					dyn.	6–10 ft.	5 15			17 shots.
					dyn.	8–15 ft.	5 45			25 shots.
					Tnr. sdr. (e)					
					Tnr. sdr. (e)					
86	83				12′ Agz.	botm.	20	S. 64° E.	1.0	
					Tnr. sdr. (e)					
87	83				12′ Agz.	botm.	14	S. 74° E.	.7	
					Tnr. sdr. (e)					
87	84				12′ Agz.	botm.	20	S. 51° E.	.8	
					Tnr. sdr. (e)					
88	84				12′ Agz.	botm.	20	E.	.7	
					dyn.	10–15 ft.	8 00			20 shots.
					Tnr. sdr. (e)					
84	83				12′ Agz.	botm.	20	E. by S.	1.0	
					Tnr. sdr. (e)					
84	83				12′ Agz.	botm.	24	E. ¼ S.	1.2	
					Tnr. sdr. (e)					
84	83				12′ Agz.	botm.	21	N. 58° E.	1.2	
					Tnr. sdr. (e)					
85	83				12′ Agz.	botm.	30	N. 70° E.	1.2	
					Tnr. sdr. (e)					

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Between Samar and Leyte, vicinity of Surigao Strait—Continued.					
			1909.		*fms.*	
D. 5485	Cabugan Grande Id. (N.), N. 59° W., 10.5 miles (10° 22′ 15″ N., 125° 22′ 30″ E.).	C. S. 4719; Aug., 1907.	July 30	12.42 p. m. 12.57 p. m.	103	gn. M.
	Between Leyte and Mindanao.					
D. 5486	Botobolo Pt. (Panaon Id.), S. 19° W., 6 miles (10° 02′ N., 125° 19′ 20″ E.).	C. S. 4719; Aug. 1907.	July 31	8.37 a. m. 9.20 a. m.	585	
D. 5487	San Ricardo Pt. (Panaon Id.), S. 50° E., 11.2 miles (10° 02′ 45″ N., 125° 05′ 33″ E.).	do	do	1.11 p. m. 2.03 p. m.	732	gn. M.
D. 5488	San Ricardo Pt. (Panaon Id.), S. 59° E., 9 miles (10° N., 125° 6′ 45″ E.).	do	do	3.59 p. m. 4.52 p. m.	772	gn. M.
D. 5489	San Ricardo Pt. (Panaon Id.), N. 42° E., 6.6 miles (9° 50′ 30″ N., 125° 10′ E.)	do	do	7.21 p. m.		
D. 5490	San Ricardo Pt., N. 9° E., 23.9 miles (9° 32′ N, 125° 11′ E.)	do	Aug. 1	5.10 a. m. 6.20 a. m.	830	gn. M.
D. 5491	Diuata Pt. (W.), S. 9° W., 19.3 miles (9° 24′ N., 125° 12′ E.).	do	do	8.25 a. m. 10.12 a. m.	736	gn. M., Co.
D. 5492	Diuata Pt. (W.), S. 45° W., 15.2 miles (9° 12′ 45″ N., 125° 20′ E.).	do	do	12.42 p. m. 1.31 p. m.	735	gy. M.
D. 5493	Diuata Pt. (N.), N. 84° W., 5.5 miles (9° 04′ N., 125° 20′ E.).	do	Aug. 2	6.13 a. m. 7.03 a. m.	478	gn. M.
D. 5494	Diuata Pt. (N.), N. 74° W., 4.2 miles (9° 06′ 30″ N., 125° 18′ 40″ E.).	do	do	8.30 a. m. 9.17 a. m.	678	gn. M., S.
D. 5495	Diuata Pt. (N.), S. 76° E., 9.4 miles (9° 06′ 30″ N., 125° 00′ 20″ E.).	do	do	12.44 p. m. 1.54 p. m.	976	gy. M.
	Mahinog River, Camiguin Id. (mouth).	do	Aug. 3	2.30 a. m.		
	Mahinog, Camiguin Id	do	do	6.30 a. m.		S., Co.
D. 5496	Bantigui Id., N. 64° W., 7 miles (9° 08′ 26″ N., 124° 57′ E.).	do	do	7.40 a. m. 8.46 a. m.	788	
D. 5497	Bantigui Id., N. 64° W., 10 miles (9° 07′ 15″ N., 124° 59′ 30″ E.).	do	do	9.55 a. m. 10.59 a. m.	960	gn. M., fne. S.
D. 5498	Bantigui Id., N. 64° W., 10 miles (9° 07′ 15″ N., 124° 59′ 30″ E.).	do	do	2.50 p. m.	960	gn. M., fne. S.
	Northern Mindanao and vicinity.					
D. 5499	Macabalan Pt. Lt. (Mindanao), S. 20° E., 11.6 miles (8° 41′ 30″ N., 124° 35′ 40″ E.).	C. S. 4719; Aug., 1907.	Aug. 4	9.10 a. m. 9.50 a. m.	554	gn. M., fne. S.
D. 5500	Macabalan Pt. Lt. (Mindanao), S. 20° E., 7.9 miles (8° 37′ 45″ N., 124° 36′ 45″ E.).	do	do	11.05 a. m. 11.25 a. m.	267	gn. M.
	Opol, Macajalar Bay (Mindanao).	C. S. 4644; July, 1905.	do	1.00 p. m.		S., Co.
D. 5501	Macabalan Pt. Lt. (Mindanao), S. 35° E., 8.2 miles (8° 37′ 37″ N., 124° 35′ E.).	C. S. 4719; Aug., 1907.	do	1.50 p. m. 2.28 p. m.	214	fne. S., gy. M.
D. 5502	Macabalan Pt. Lt. (Mindanao), S. 35° E., 8.2 miles (8° 37′ 37″ N., 124° 35′ E.).	do	do	3.28 p. m.	**214	

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Tnr. sdr. (e)					
85	83				12′ Agz	botm	20	N. 40° E	1.7	
		52.1			Luc. sdr. (a)					
84	82				12′ Agz	botm	21	S. 37° E	3.0	
		52.3			Luc. sdr. (a)					
84	84				12′ Agz	botm	23	S. 65° E	2.7	
		52.3			Luc. sdr. (a)					
85	83				12′ Agz	botm	46	S. 43° E	3.5	
					K. 2	10 ft	46	S. 43° E	3.5	
84	83				int. 4 §	50 fms	20	S	.5	
							4			
					K. 5	surface	20	S	.5	
							4			
		52.5			Luc. sdr. (a)					
83	84				12′ Agz	botm	12	S. 28° E	.9	Whole apparatus carried away.
		52.3			Luc. sdr. (a)					
84	83				12′ Agz	botm	31	S. 45° E	2.7	
		52.3			Luc. sdr. (a)					
84	85				12′ Agz	botm	28	S. 14° E	2.3	
		52.1			Luc. sdr. (a)					
80	83				12′ Agz	botm	45	N. 32° W	3.0	
		53.3			Luc. sdr. (a)					
82	83				12′ Agz	botm	35	N. 5° E	3.2	
					K. 5	surface	35	N. 5° E	3.2	
		52.3			Luc. sdr. (a)					
84	83				12′ Agz	botm	35	S. 17° E	2.7	
					K. 5	600 fms	33	S. 17° E	2.0	
					25′ seine; dyn.		3 00			Mouth of river.
					dyn.	12–20 ft.	10 00			21 shots.
		52.3			Luc. sdr. (a)					
80	83				12′ Agz	botm	16	S. 52° E	2.5	Lost apparatus and 1,000 fms. wire.
		52.3			Luc. sdr. (a)					
80	83				int. 4 §	800 fms.	20	S. 60° E	2.6	
							35			
82	84				12′ Agz	botm	27	S. 48° E	3.4	
		52.3			Luc. sdr. (a)					
83	84				12′ Agz	botm	5	N. 76° E	1.9	Bridle stops lost frame twisted.
		53.5			Luc. sdr. (a)					
87	84				int. 4 §	200 fms.	18	S. 67° E	1.0	
							13			
					dyn.	5–12 ft.	4 30			20 shots.
		54.3			Luc. sdr. (a)					
85	86				12′ Tnr	botm	20	S. 38° E	1.5	
84	86				12′ Tnr	botm	20	S. 38° E	1.7	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Northern Mindanao and vicinity—Continued.		1909.		*fms.*	
D. 5503	Macabalan Pt. Lt. (Mindanao), S. 31° E., 6.6 miles (8° 36′ 26″ N., 124° 36′ 08″ E.).	C. S. 4719; Aug., 1907.	Aug. 4	4.10 p. m. 4.38 p. m.	226	gn. M
D. 5504	Macabalan Pt. Lt. (Mindanao), S. 39° E., 6 miles (8° 35′ 30″ N., 124° 36′ E.).	do	Aug. 5	5.50 a. m. 6.15 a. m.	200	gn. M
D. 5505	Macabalan Pt. Lt. (Mindanao), S. 31° E., 7.7 miles (8° 37′ 15″ N., 124° 36′ E.).	do	do	7.25 a. m.	*220	
D. 5506	Macabalan Pt. Lt. (Mindanao), S. 41° E., 12.2 miles (8° 40′ N., 124° 31′ 45″ E.).	do	do	8.40 a. m. 9.12 a. m.	262	gn. M
D. 5507	Camp Overton Lt., Iligan Bay (Mindanao), S. 1° E., 8.6 miles (8° 21′ 12″ N., 124° 12′ 06″ E.).	C. S. 4613; June, 1906.	do	1.09 p. m. 1.44 p. m.	425	gn. M., fne. S
D. 5508	Camp Overton Lt., Iligan Bay, S. 6° E., 4.9 miles (8° 17′ 24″ N., 124° 11′ 42″ E.).	do	do	2.53 p. m. 3.17 p. m.	270	gn. M., fne. S
	Camp Overton, Iligan Bay (Mindanao).	do	Aug. 6	8.00 a. m.		Co., S
	Nonucan R., Iligan Bay (near Camp Overton).	do	do	8.00 a. m.		
D. 5509	Camp Overton Lt., S. 61° E., 5.7 miles (8° 15′ 24″ N., 124° 07′ 18″ E.).	do	Aug. 7	8.06 a. m. 8.36 a. m.	377	gy. M
D. 5510	Camp Overton Lt., S. 68° E., 9.1 miles (8° 16′ N., 124° 03′ 50″ E.).	do	do	9.53 a. m. 10.31 a. m.	423	gy. M., fne. S
D. 5511	Camp Overton Lt., S. 80° E., 15.3 miles (8° 15′ 20″ N., 123° 57′ E.).	do	do	11.46 a. m. 12.18 p. m.	410	gy. M., S
D. 5512	Camp Overton Lt., S. 76° E., 14 miles (8° 16′ 02″ N., 123° 58′ 26″ E.).	do	do	1.09 p. m. 1.46 p. m.	445	gy. M., fne. S
D 5513	Camp Overton Lt., S. 67° E., 10.3 miles (8° 16′ 45″ N., 124° 02′ 48″ E.).	do	do	3.07 p. m. 3.53 p. m.	505	gy. M., fne. S
D. 5514	Camp Overton Lt., S. 34° E., 24.3 miles (8° 32′ 42″ N., 123° 58′ 36″ E.).	do	Aug. 8	7.58 a. m. 8.50 a. m.	697	gn. M., S
D. 5515	Camp Overton Lt., S. 26° E., 24.6 miles (8° 34′ 48″ N., 124° 01′ 24″ E.).	do	do	10.42 a. m.		
	Inamucan Bay (Mindanao).	do	do	2.30 p. m.		R., Co
	do	do	Aug. 9	5.30 a. m.		S
	Murcielagos Bay (Mindanao).	C. S. 4641; Apr., 1902.	do	9.30 a. m.		Co., S
D. 5516	Pt. Tagolo Lt. (Mindanao), S. 80° W., 9.7 miles (8° 46′ N., 123° 32′ 30″ E.).	C. S. 4723; Oct., 1905.	do	9.57 a. m. 10.21 a. m.	175	Glob
D. 5517	Pt. Tagolo Lt., S. 83° W., 10.5 miles (8° 45′ 30″ N., 123° 33′ 45″ E.).	do	do	11.00 a. m. 11.21 a. m.	169	Glob
D. 5518	Pt. Tagolo Lt., S. 64° W., 8.7 miles (8° 48′ N., 123° 31′ E.).	do	do	12.36 p. m. 12.55 p. m.	200	gy. M., Glob
D. 5519	Pt. Tagolo Lt., S. 71° W., 8.7 miles (8° 47′ N., 123° 31′ 15″ E.).	do	do	1.38 p. m. 1.56 p. m.	182	Glob., S
D. 5520	Pt. Tagolo Lt., N. 48° E., 4.5 miles (8° 41′ 15″ N., 123° 18′ 30″ E.).	do	Aug. 10	6.02 a. m. 6.20 a. m.	102	
D. 5521	Pt. Tagolo Lt., S. 11° E., 3 miles (8° 47′ N., 123° 22′ 30″ E.).	do	do	7.24 a. m. 7.51 a. m.	221	fne. S
	Silino Id. (west)	do	do	8.40 a. m.		S., Co
D. 5522	Pt. Tagolo Lt., S. 39° W., 6 miles (8° 49′ N., 123° 26′ 30″ E.).	do	do	9.11 a. m. 9.57 a. m.	230	Glob.

Steamer Albatross in the Philippine Islands, 1907–1910—Continued.

Temperatures. Air.	Temperatures. Surface.	Temperatures. Bottom.	Density. Surface.	Density. Bottom.	Apparatus.	Trial. Depth.	Trial. Duration.	Drift. Direction.	Drift. Distance.	Remarks.
°F.	°F.	°F.					h. m.		mi.	
		53.3			Luc. sdr. (a)					
83	86				12′ Tnr.	botm.	20	S. 2° E.	1.2	
		54.3			Luc. sdr. (a)					
77	83				12′ Tnr.	botm.	20	N. 7° W.	1.7	
79	83				12′ Tnr.	botm.	24	N. 18° W.	1.4	
		53.3			Luc. sdr. (a)					
84	82				12′ Tnr.	botm.	14	N. 24° W.	1.7	
		52.8			Luc. sdr. (a)					
85	84				12′ Tnr.	botm.	20	S. 8° W.	1.0	
		53.3			Luc. sdr. (a)					
84	85				12′ Tnr.	botm.	24	S. 2° E.	1.8	
					dyn.	6–12 ft.	8 00			10 shots.
					dyn.		8 30		3.5	
		53.0			Luc. sdr. (a)					
79	82				12′ Tnr.	botm.	23	N. 34° W.	1.4	
		53.0			Luc. sdr. (a)					
83	84				12′ Tnr.	botm.	7	S. 44° W.	1.6	Net badly torn.
		53.0			Luc. sdr. (a)					
84	85				12′ Tnr.	botm.	20	N. 64° E.	1.9	
		52.8			Luc. sdr. (a)					
91	86				12′ Tnr.	botm.	20	N. 74° E.	2.2	
		52.8			Luc. sdr. (a)					
84	85				12′ Tnr.	botm.	15	S. 83° E.	1.7	Beam frame sprung; net torn.
		52.3			Luc. sdr. (a)					
81	83				12′ Tnr.	botm.	27	N. 47° E.	3.0	Net fouled over beam.
85	83				12′ Tnr.	botm.	28	S. 20° W.	1.6	No sounding, depth about 700 fms.
					dyn.	8–15 ft.	3 00			11 shots.
					430′ seine.	3 ft.	2 00			3 hauls.
					dyn.	6–25 ft.	4 15			15 shots.
		54.3			Luc. sdr. (a)					
85	84				12′ Tnr.	botm.	20	S. 63° E.	1.2	
		54.3			Luc. sdr. (a)					
83	85				12′ Tnr.	botm.	18	S. 50° E.	1.1	
		54.0			Luc. sdr. (a)					
84	85				12′ Tnr.	botm.	21	S. 9° E.	1.2	
		54.3			Luc. sdr. (a)					
83	85				12′ Tnr.	botm.	43	S. 14° E.	1.6	
		61.3			Luc. sdr. (a)					
79	84				12′ Tnr.	botm.	24	N. 13° E.	1.3	No bottom sample in sounding cup.
		53.3			Luc. sdr. (a)					
81	84				12′ Tnr.	botm.	4	N. 52 E.	.9	Whole apparatus carried away.
					dyn.	10–20 ft.	3 00			13 shots.
		52.3			Luc. sdr. (a)					
81	84				12′ Tnr.	botm.	18	S. 79° E.	1.2	Net fouled over beam.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Northern Mindanao and vicinity—Continued.		1909.		*fms.*	
D. 5523	Pt. Tagolo Lt., S. 48° W., 6.7 miles (8° 48′ 44″ N., 123° 27′ 35″ E.).	C. S. 4723; Oct., 1905.	Aug. 10	10.49 a. m.		
D. 5524	Pt. Tagolo Lt., S. 34° W., 17 miles (8° 58′ 07″ N., 123° 32′ 45″ E.).	....do.....	...do....	1.06 p. m. 1.51 p. m.	360	S.
	Between Siquijor and Bohol Ids.					
D. 5525	Balicasag Id. (C.), N. 11° W., 18.2 miles (9° 12′ 30″ N., 123° 44′ 07″ E.).	C. S. 4718; Dec., 1906.	Aug. 11	8.28 a. m.	405	gy. M.
D. 5526	Balicasag Id. (C.), N. 15° W., 18.4 miles (9° 12′ 45″ N., 123° 45′ 30″ E.)	....do.....	...do....	9.29 a. m. 10.36 a. m.	805	gn. M., Glob.
D. 5527	Balicasag Id. (C.), N. 14° W., 8.2 miles (9° 22′ 30″ N., 123° 42′ 40″ E.)	....do.....	...do....	1.07 p. m. 1.38 p. m.	392	glob. Oz.
D. 5528	Balicasag Id. (C.), N. 15° E., 5.8 miles (9° 24′ 45″ N., 123° 39′ 15″ E.)	....do.....	...do....	3.08 p. m. 3.42 p. m.	439	glob. Oz.
D. 5529	Balicasag Id. (C.), N. 11° E., 6.9 miles (9° 23′ 45″ N., 123° 39′ 30″ E.).	....do.....	...do....	4.44 p. m. 5.19 p. m.	441	gy. M., Glob.
D. 5530	Balicasag Id. (C.), N. 32° E., 4.3 miles (9° 26′ 45″ N., 123° 38′ 30″ E.).	....do.....	...do....	7.14 p. m.		
D. 5531	Balicasag Id. (C.), N. 43° E., 4.2 miles (9° 27′ 30″ N., 123° 38′ 00″ E.).	....do.....	...do....	7.49 p. m.		
	Between Masbate and Leyte.					
D. 5532	Gigantangan Id. (S.), S. 33° E., 3.8 miles (11° 36′ 39″ N., 124° 13′ 30″ E.).	C. S. 4718; Dec., 1906.	Aug. 13	7.14 p. m.		
	Between Cebu and Siquijor.					
D. 5533	Balicasag Id. (C.), N. 71° E., 9.4 miles (9° 27′ 15″ N., 123° 31′ 48″ E.).	C. S. 4718; Dec., 1906.	Aug. 19	5.30 a. m. 6.08 a. m.	432	gn. M., S.
D. 5534	Balicasag Id. (C.), N. 72° E., 14.7 miles (9° 26′ 00″ N., 123° 26′ 37″ E.).	....do.....	...do....	8.23 a. m. 8.53 a. m.	333	gy. glob. Oz.
D. 5535	Apo Id. (C.), S. 24° W., 17 miles (9° 20′ 30″ N., 123° 23′ 45″ E.).	....do.....	...do....	10.38 a. m. 11.07 a. m.	310	gy. glob. Oz.
	Between Negros and Siquijor.					
D. 5536	Apo Id. (C.), S. 26° W., 11.8 miles (9° 15′ 45″ N., 123° 22′ 00″ E.).	C. S. 4718; Dec., 1906.	Aug. 19	12.50 p. m. 1.36 p. m.	279	gn. M.
D. 5537	Apo Id. (C.), S. 46° W., 8.7 miles (9° 11′ 00″ N., 123° 23′ 00″ E.).	....do.....	...do....	3.15 p. m. 3.39 p. m.	254	gn. M.
D. 5538	Apo Id. (C.), S. 64° W., 7.3 miles (9° 08′ 15″ N., 123° 23′ 20″ E.).	....do.....	...do....	4.55 p. m. 5.20 p. m.	256	gn. M., S.
D. 5539	Apo Id. (C.), N. 78° W., 8.2 miles (9° 03′ 20″ N., 123° 24′ 45″ E.).	....do.....	...do....	7.11 p. m.		
D. 5540	Apo Id. (C.), N. 76° W., 8.1 miles (9° 03′ 00″ N., 123° 24′ 30″ E.).	....do.....	...do....	7.42 p. m.		

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
82	84				12′ Tnr.; m. b.	botm.	20	S. 22° E.	1.2	No sounding.
		52.8			Luc. sdr. (a)					
83	84				12′ Tnr.	botm.	22	S. 16° W.	1.2	
82	82	53.3			12′ Tnr.	botm.	22	N. 85° E.	1.7	
82	82	52.3			Luc. sdr. (a)					
84	84				12′ Tnr.	botm.	17	E.	1.8	
		53.3			Luc. sdr. (a)					
87	84				12′ Tnr.	botm.	20	S. 14° E.	1.2	
		53.3			Luc. sdr. (a)					
87	85				12′ Tnr.	botm.	29	S. 17° E.	1.3	
		53			Luc. sdr. (a)					
85	85				12′ Thr.; m. b.	botm.	35	S. 17° E.	1.6	
84	84				int. 4	surface	20			
83	84				int. 4	surface	28			
86	84				int. 4	surface	14			
		53.3			Luc. sdr. (a)					
80	81				12′ Tnr.	botm.	23	S. 30° E.	1.3	
		53.3			Luc. sdr. (a)					
82	82				12′ Tnr.	botm.	20	S. 64° W.	1.8	
		53.3			Luc. sdr. (a)					
83	84				12′ Tnr.	botm.	09	S. 69° W.	1.5	Bridle carried away at surface, causing loss of most of catch.
		53.5			Luc. sdr. (a)					
84	85				12′ Tnr.	botm.	20	S. 60° W.	2.7	
					K. 5.					
87	84	53.5			Luc. sdr. (a)					
85	84				12′ Tnr.	botm.	20	S. 75° W.	2.0	
		53.3			Luc. sdr. (a)					
83	83				12′ Tnr.	botm.	22	S. 80° W.	1.3	
83	83				int. 4	surface	19			
83	83				int. 4	surface	16			

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Northern Mindanao and vicinity.					
			1909.		*fms.*	
D. 5541	Tagolo Lt., S. 65° W., 12.7 miles (8° 49′ 38″ N., 123° 34′ 30″ E.).	C. S. 4723; Oct., 1905.	Aug. 20	5.25 a. m. 5.51 a. m.	219	fne. S., brk. Sh.
D. 5542	Tagolo Lt., S. 70° W., 13.2 miles (8° 48′ 30″ N., 123° 35′ 30″ E.).	...do...	...do...	6.34 a. m. 6.56 a. m.	200	fne. S., brk. Sh.
D. 5543	Tagolo Lt., S. 75° W., 12.5 miles (8° 47′ 15″ N., 123° 35′ 00″ E.).	...do...	...do...	8.46 a. m. 9.04 a. m.	162	S.
....	Murcielagos Bay (Mindanao).	C. S. 4641; Apr., 1902.	...do...	1.00 p. m.	....	S., Co
....	Cascade River, Murcielagos Bay.	...do...	...do...	1.00 p. m.	....	
D. 5544	Coronado Pt., S. 37° W., 21.5 miles (8° 16′ 30″ N., 122° 26′ 30″ E.).	C. S. 4723... Oct., 1905.	Sept. 6	10.34 a. m. 11.17 a. m.	759	gn. M., fne. S
	East of Zamboanga.					
....	Tictauan Id., east	C. S. 4511; Dec., 1904.	Sept. 8	7.45 a. m.	....	S., Co., R
....	Malanipa Id., northeast	...do...	...do...	1.00 p. m.	....	S., R., Co
....	Sacol Id., northeast	...do...	...do... Sept. 9	7.00 p. m. 6.00 a. m.	....	Co.
....	Tulnalutan Id., north	...do...	...do...	1.00 p. m.	....	Co., S., R
	South of Zamboanga.					
....	Isabel Channel, Basilan Id.	C. S. 4543; May, 1907.	Sept. 11	8.30 a. m.	....	S., Co
....	Lampinigan Id., north and east.	...do...	...do... ...do...	1.30 p. m. 7.30 p. m.	....	Co., S.
....	Balukbaluk Id., west	C. S. 4511; Dec., 1904.	Sept. 12	8.30 a. m.	....	Co., S.
....	Pilas Id., northeast	...do...	...do...	2.00 p. m.	....	Co.
....	Tapiantana Id., north	C. S. 4512; Sept., 1906.	Sept. 13	9.30 a. m.	....	S., Co.
....	Bulan Id., north	...do... ...do...	...do... ...do...	3.00 p. m. 7.30 p. m.	....	Co.
....	Tonquil Id., Gumila Reef	...do...	Sept. 14	8.30 a. m.	....	Co., S.
....	Tonquil Id., northwest	...do...	...do...	2.00 p. m.	....	Co., S.
	Jolo I. and vicinity.					
....	Tulayan Id.	C. S. 4512; Sept., 1906	Sept. 15	9.00 a. m.	....	Co., S
D. 5545	Noble Pt., Tulayan Id. (E.), S. 19° W., 3 miles (6° 04′ 45″ N., 121° 20′ 20″ E.).	...do...	...do...	9.26 a. m. 9.43 a. m.	114	fne. co. S
D. 5546	Noble Pt., Tulayan Id. (E.) S. 13° W., 5 miles (6° 06′ 48″ N., 121° 20′ 32″ E.).	...do...	...do...	10.34 a. m. 10.52 a. m.	138	fne. co. S
D. 5547	Noble Pt., Tulayan Id. (E.), S. 38° E., 9.5 miles (6° 09′ 20″ N., 121° 13′ 40″ E.).	C. S. 4542; Apr., 1903.	...do...	1.31 p. m. 1.51 p. m.	155	fne. S.
D. 5548	Jolo Lt. (Jolo), N. 77° E., 14.9 miles (6° 00′ 20″ N., 120° 45′ 35″ E.).	...do...	Sept. 17	7.55 a. m. 8.20 a. m.	232	S., brk. Sh.
D. 5549	Jolo Lt. (Jolo), N. 80° E., 15.8 miles (6° 01′ 15″ N., 120° 44′ 20″ E.).	...do...	...do...	9.09 a. m. 9.36 a. m.	263	S., Glob., For.
D. 5550	Jolo Lt. (Jolo), N. 83° E., 15.5 miles (6° 02′ 00″ N., 120° 44′ 40″ E.).	...do...	...do...	10.20 a. m. 10.46 a. m.	258	fne. S., Sh.
....	Sulade Id., north	...do...	...do...	1.00 p. m.	....	Co., S.
D. 5551	Jolo Lt. (E.), N. 60° E., 18 miles (5° 54′ 48″ N., 120° 44′ 24″ E.).	...do...	...do...	1.46 p. m. 2.07 p. m.	193	fne. S.

Steamer Albatross in the Philippine Islands, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
....	....	53.3	....	....	Luc. sdr. (a)	....	....	....	....	
81	83	......	....	....	12′ Tnr	botm	21	S. 17° E	1.0	
....	....	54.3	....	....	Luc. sdr. (a)	....	....	....	....	
83	83	......	....	....	12′ Tnr	botm	20	S. 25° W	1.4	Net came up torn and tangled.
....	....	54.5	....	....	Luc. sdr. (a)	....	....	....	....	
86	84	......	....	....	12′ Tnr	botm	17	S. 20° W	.7	Bridle stops carried away, frame bent, net badly torn.
....	....	......	....	....	dyn	4–12 ft	8 00	....	....	22 shots.
....	....	......	....	....	dyn	....	4 30	....	1.5	
....	....	49.8	....	....	Luc. sdr. (a)	....	....	....	....	
82	83	......	....	....	int. 4 §	600 fms.	20	N. 49° W	1.5	
							33	....	....	
....	....	......	....	....	dyn	10–15 ft.	3 30	....	....	12 shots.
....	....	......	....	....	dyn	10–18 ft.	2 45	....	....	10 shots.
....	....	......	....	....	dip; e. l	....	1 00	....	....	
....	....	......	....	....	dyn	12–15 ft.	4 00	....	....	Do.
....	....	......	....	....	dyn	9–20 ft	3 30	....	....	16 shots.
....	....	......	....	....	dyn	10–30 ft.	2 30	....	....	6 shots.
....	....	......	....	....	dyn	6–18 ft	4 00	....	....	18 shots.
....	....	......	....	....	dip; e. l	....	1 15	....	....	
....	....	......	....	....	dyn	8–18 ft	3 00	....	....	9 shots.
....	....	......	....	....	dyn	10–20 ft.	3 30	....	....	10 shots.
....	....	......	....	....	dyn	8–10 ft	2 00	....	....	8 shots.
....	....	......	....	....	dyn	10–15 ft.	2 30	....	....	12 shots.
....	....	......	....	....	dip; e. l	....	1 00	....	....	
....	....	......	....	....	dyn	4–6 ft	3 00	....	....	14 shots.
....	....	......	....	....	dyn	8–10 ft	3 15	....	....	12 shots.
....	....	......	....	....	dyn	8–20 ft	3 00	....	....	7 shots.
....	....	......	....	....	Luc. sdr. (e)	....	....	....	....	
82	82	......	....	....	9′ Tnr	botm	16	S. 34° E	1.1	
....	....	58.3	....	....	Luc. sdr. (a)	....	....	....	....	
83	82	......	....	....	9′ Tnr	botm	19	S. 49° E	1.4	
....	....	56.3	....	....	Luc. sdr. (a)	....	....	....	....	
84	82	......	....	....	9′ Tnr	botm	20	S. 32° E	1.5	
....	....	53.5	....	....	Luc. sdr. (a)	....	....	....	....	
82	82	......	....	....	9′ Tnr.; m. b	botm	29	N. 55° W	1.5	
....	....	52.3	....	....	Luc. sdr. (a)	....	....	....	....	
83	83	......	....	....	9′ Tnr.; m. b	botm	21	N. 23° E	1.1	
....	....	52.3	....	....	Luc. sdr. (a)	....	....	....	....	
85	83	......	....	....	9′ Tnr	botm	28	S. 60° E	1.2	
....	....		....	....	dyn	10–15 ft.	4 00	....	....	14 shots.
....	....	53.3	....	....	Luc. sdr. (a)	....	....	....	....	
84	83	......	....	....	9′ Tnr	botm	20	S. 15° E	1.1	

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Jolo I. and vicinity—Cont'd.		1909.		*fms.*	
D. 5552	Jolo Lt. (E.), N. 60° E., 18.3 miles (5° 54′ 30″ N., 120° 44′ 15″ E.).	C. S. 4542; Apr., 1903.	Sept. 17	 3.18 p. m.		
D. 5553	Sulade Id. (NW.), S. 4° E., 0.5 mile (5° 51′ 00″ N., 120° 46′ 30″ E.).	do.	do.	 7.28 p. m.		
D. 5554	Cabalian Pt. (Jolo), N. 76° E., 3.8 miles (5° 52′ 27″ N., 120° 52′ 18″ E.).	do.	Sept. 18.	9.19 a. m. 9.29 a. m.	25	Co., S.
D. 5555	Cabalian Pt. (Jolo), N. 50° W., 3.3 miles (5° 51′ 15″ N., 120° 58′ 35″ E.).	do.	do.	10.59 a. m. 11.09 a. m.	34	crs. S.
D. 5556	Cabalian Pt., N. 59° W., 4.5 miles (5° 50′ 55″ N., 121° 00′ 00″ E.).	do.	do.	 11.36 a. m.	15	
	Teomabal Id. (N.).	do.	do.	1.30 p. m.		sctrd. Co., S.
D. 5557	Cabalian Pt., N. 70° W., 5.2 miles (5° 51′ 30″ N., 121° 01′ 00″ E.).	do.	do.	 2.58 p. m.	13	S., Co.*
D. 5558	Cabalian Pt., S., 1.1 miles (5° 51′ 33″ N., 121° 00′ 58″ E.).	do.	do.	 3.17 p. m.	15	Co.*
D. 5559	Cabalian Pt., N. 66° W., 5.1 miles (5° 51′ 36″ N., 121° 00′ 45″ E.).	do.	do.	 3.35 p. m.	13	Co.*
D. 5560	Cabalian Pt., N. 76° W., 5 miles (5° 52′ 00″ N., 121° 01′ 06″).	do.	do.	 4.04 p. m.	14	
D. 5561	Teomabal Id. (NW.), S. 36° W., 0.2 mile (5° 50′ 45″ N., 121° 01′ 15″ E.).	do.	do.	 6.13 p. m.	 *10	
	Tutu Bay (Jolo).	do.	Sept. 19.	8.15 a. m. 1.45 p. m.		Co., S. Co., S.
D. 5562	Tañun Pt. (Jolo), N. 87° E., 17.2 miles (5° 54′ 20″ N., 121° 13′ 12″ E.).	do.	do.	 6.07 p. m.		
	Between Jolo and Tawi Tawi.					
	Siasi Id., north	C. S. 4544; Oct., 1906.	Sept. 20.	10.30 a. m.		Co., S.
	Tara Id., Panpan Pt.	do.	do.	1.00 p. m.		Co., S.
	Bolipongpong Id., south	C. S. 4722; Jan., 1909.	do.	3.30 p. m.		S., Co., R.
	Singaan Id., north.	do.	Sept. 21.	10.00 a. m.		Co.
D. 5563	Dammi Id. (N.), N. 79° W., 6.1 miles (5° 48′ 12″ N., 120° 30′ 48″ E.).	do.	do.	10.25 a. m. 10.47 a. m.	224	fne. co. S
D. 5564	Dammi Id. (N.), S. 85° W., 6.1 miles (5° 50′ 00″ N., 120° 31′ 00″ E.).	do.	do.	11.24 a. m. 11.45 a. m.	236	fne. Co., S
D. 5565	Dammi Id. (N.), S. 69° W., 6 miles (5° 51′ 42″ N., 120° 30′ 30″ E.).	do.	do.	12.32 p. m. 1.00 p. m.	243	S., ptr. Sh
D. 5566	Dammi Id. (N.), S. 67° W., 6.8 miles (5° 52′ 12″ N., 120° 31′ 00″ E.).	do.	do.	1.42 p. m. 2.07 p. m.	244	fne. S., Sh.
	North of Tawi Tawi.					
D. 5567	Dammi Id. (N.), N. 81° W., 9 miles (5° 48′ 00″ N., 120° 33′ 45″ E.).	C. S. 4722; Jan., 1909.	Sept. 21.	3.36 p. m. 4.05 p. m.	268	fne. S.
D. 5568	Singaan Id. (N.), West, 0.9 mile (5° 45′ 50″ N., 120° 26′ 00″ E.).	do.	do.	6.35 p. m.	13	S., Co.
D. 5569	Simaluc Id. (SE.), S. 8° W., 6.4 miles (5° 33′ 15″ N., 120° 15′ 30″ E.).	do.	Sept. 22.	8.19 a. m. 8.49 a. m.	303	co. S
D. 5570	Simaluc Id. (SE.), S. 17° E., 5.7 miles (5° 32′ 15″ N., 120° 12′ 57″ E.).	do.	do.	9.55 a. m. 10.27 a. m.	330	fne. S., Glob.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
83	83				9′ Tnr.; m. b.	botm.	21	S. 23° E.	1.5	Depth about as previous station.
82	83				int. 4	surface.	10 41			Ship at anchor.
					Tnr. sdr. (e)					
83	84				6′ McC	botm.	6	N. 74° W.	.2	Net torn.
					Tnr. sdr. (e)					
82	83				6′ McC	botm.	4	N. 75° E.	.5	
					hand lead					
82	83				6′ McC	botm.	3	N. 68° E.	.3	Trawl and 15 fms cable lost.
					dyn.	10–25 ft.	3 30			7 shots.
					hand lead					
83	82				6′ McC	botm.	5	S. W.	.1	
					hand lead					
83	82				6′ McC	botm.	3	S. 44° W.	.4	
					hand lead					
83	82				6′ McC	botm.	7	S. W.	.6	
					hand lead					
83	82				6′ McC	botm.	9	S. 20° E.	.5	Everything carried away except bridle.
81	82				int. 4	surface.	11 47			Ship at anchor.
					dyn.	10–20 ft.	2 15			7 shots.
					dyn.	2–20 ft.	2 30			10 shots.
84	82				int. 4	surface.	11 41			Ship at anchor.
					dyn.	15 ft.	1 30			5 shots.
					dyn.	8–15 ft.	1 30			Do.
					dyn.	8–20 ft.	1 45			Do.
					dyn.	9–25 ft.	8 00			17 shots.
		52.3			Luc. sdr. (a)					
83	83				9′ Tnr.; m. b.	botm.	18	N. 6° W.	1.3	
		52.3			Luc. sdr. (a)					
84	83				9′ Tnr.	botm.	28	N. 9° E.	1.5	
		52.3			Luc. sdr. (a)					
86	84				9′ Tnr.; m. b.	botm.	21	N. 45° E.	.7	
		52.5			Luc. sdr. (a)					
84	84				9′ Tnr.	botm.	27	N. 56° E.	1.6	
		52.0			Luc. sdr. (a)					
85	83				9′ Tnr.; m. b.	botm.	21	N. 71° E.	1.2	
82	83				int. 4	surface.	11 20			Ship at anchor.
		52.3			Luc. sdr. (a)					
84	83				9′ Tnr.; m. b.	botm.	10	S. 73° E.	1.0	Net torn.
		52.3			Luc. sdr. (a)					
87	83				9′ Tnr.; m. b.	botm.	17	N. 45° W.	1.0	Net came up fouled on bolt head.

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	North of Tawi Tawi—Cont'd.		1909.		*fms.*	
....	Simaluc Id., north	C. S. 4722; Jan., 1909.	Sept. 22.	12.30 p. m.	....	S., Co.
D. 5571	Simaluc Id. (N.), S. 66° E., 5.8 miles (5° 30′ 45″ N., 120° 07′ 57″ E.).	do	do	1.31 p. m. 2.00 p. m.	340	S., Sh.
D. 5572	Simaluc Id. (N.), S. 51° E., 4.7 miles (5° 31′ 26″ N., 120° 09′ 45″ E.).	do	do	3.02 p. m. 3.34 p. m.	334	S.
D. 5573	Simaluc Id. (N.), S. 86° E., 0.4 mile (5° 28′ 30″ N., 120° 13′ 00″ E.).	do	do	6.03 p. m.	12	
D. 5574	Simaluc Id. (N.), S. 66° E., 5.8 miles (5° 30′ 45″ N., 120° 07′ 57″ E.).	do	Sept. 23.	7.20 a. m.	340	
D. 5575	Mt. Dromedario (Tawi Tawi), S. 16° W., 19.2 miles (5° 28′ 30″ N., 120° 02′ 27″ E.).	C. S. 4514; Jan., 1906	do	9.07 a. m. 9.43 a. m.	315	Co., S.
D. 5576	Mt. Dromedario, S. 22° W., 17.2 miles (5° 25′ 56″ N., 120° 03′ 39″ E.).	C. S. 4722; Jan., 1909.	do	10.50 a. m. 11.22 a. m.	277	S.
....	Bacun River (Tawi Tawi)	C. S. 4514; Jan., 1906.	do	1.30 p. m.	....	
....	Simaluc Sibi Sibi Id	do	do	1.30 p. m.	....	Co., wh. S.
D. 5577	Mt. Dromedario, S. 9° W., 10.9 miles (5° 20′ 36″ N., 119° 58′ 51″ E.).	do	do	2.38 p. m. 3.01 p. m.	240	crs. S.
D. 5578	Mt. Dromedario, S. 9° W., 4.8 miles (5° 14′ 38″ N., 119° 57′ 57″ E.).	do	do	8.00 p. m.	10	
	Vicinity of Darvel Bay, Borneo.					
....	Reef NW. of Tumindao Id	C. S. 4722; Jan., 1909.	Sept. 24.	1.00 p. m.	....	Co., S.
D. 5579	Sibutu Id. peak, S. 77° E., 20.3 miles (4° 54′ 15″ N., 119° 09′ 52″ E.).	do	Sept. 25.	8.03 a. m. 8.25 a. m.	175	fne. S., Co.
D. 5580	Sibutu Id. peak, S. 82° E., 23.2 miles (4° 52′ 45″ N., 119° 06′ 45″ E.).	do	do	9.20 a. m. 9.40 a. m.	162	br. S., Co.
....	Bumbum Id., north	do	do	2.30 p. m.	....	Co., S.
D. 5581	Bumbum Id. (NW.), S. 83° W., 3.5 miles (4° 30′ 25″ N., 118° 41′ 30″ E.).	H. O. 2117; June, 1903.	do	5.55 p. m.	21	S., Co.
D. 5582	Si Amil Id. (N.), S. 82° W., 6.2 miles (4° 19′ 54″ N., 118° 58′ 38″ E.).	do	Sept. 26.	10.11 a. m. 11.15 a. m.	890	gy. M., fne. S.
....	Danawan Id	do	do Sept. 27.	2.00 p. m. 8.15 a. m.	....	S., Co. S., Co.
	Sibuko Bay, Borneo, and vicinity.					
D. 5583	Si Amil Id. (N.) N. 88 W, 3.2 mile (4° 19′ 00″ N., 118° 56′ 20″ E.).	H. O. 2117; June, 1903.	Sept. 27	1.48 p. m. 2.33 p. m.	447	fne. S.
D. 5584	Si Amil Id. (N.) N. 74° W., 5.4 miles (4° 17′ 40″ N., 118° 57′ 42″ E.).	do	do	3.28 p. m. 4.02 p. m.	292	fn. S., gn. M.
D. 5585	Sipadan Id. (M.) S. 89° W., 12 miles (4° 07′ 00″ N., 118° 49′ 54″ E.).	do	Sept. 28	8.49 a. m. 9.31 a. m.	476	gy. M
D. 5586	Sipadan Id. (M.) West, 9.4 miles (4° 06′ 50″ N., 118° 47′ 20″ E.).	do	do	11.09 a. m. 11.44 a. m.	347	gy. M
....	Sipadan Id. (N.)	do	do	2.00 p. m.	....	Co., S
D. 5587	Sipadan Id. (W.) S. 12° E.. 3.8 miles (4° 10′ 35″ N., 118° 37′ 12. E.).	do	do	2.35 p. m. 3.11 p. m.	415	gn. M., S., Co.
D. 5588	Mabul Id. (S.) N. 81° E., 1.7 miles (4° 14′ 20″ N., 118° 36′ 48″ E.).	do	do	6.10 p. m.	11	

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dyn.	5-18 ft.	4 00			11 shots.
		52.3			Luc. sdr. (a)					
81	84				9′ Tnr.; m. b.	botm.	21	N. 67° E.	1.4	
		52.3			Luc. sdr. (a)					
82	84				9′ Tnr.; m. b.	botm.	26	N. 82° E.	1.9	
83	83				int. 4	surface.	11 42			Ship at anchor.
81	82				9′ Tnr.; m. b.	botm.	24	N. 58° E.	1.2	
		52.3			Luc. sdr. (a)					
83	83				9′ Tnr.; m. b.	botm.	20	S. 86° E.	2.2	
		53.3			Luc. sdr. (a)					
84	84				9′ Tnr.; m. b.	botm.	08	S. 2° E.	1.7	
					dyn.; sml. seines.		3 30			4 shots.
					dyn.	5-20 ft.	3 30			8 shots.
		54.3			Luc. sdr. (a)					
79	82				9′ Tnr.; m. b.	botm.	18	S. 61° E.	1.8	Mud bag lost.
77	82				int. 4	surface.	9 49			Ship at anchor.
					dyn.	5-25 ft.	4 00			17 shots.
		55.3			Luc. sdr. (a)					
80	82				9′ Tnr.; m. b.	botm.	20	S. 37° W.	1.5	
		55.8			Luc. sdr. (a)					
82	83				9′ Tnr.; m. b.	botm.	17	S. 16° W.	1.0	
					dyn.	4-15 ft.	3 00			13 shots.
82	83				int. 4	surface.	11 55			Ship at anchor.
		38.3			Luc. sdr. (a)					
81	82				9′ Tnr.; m. b.	botm.	17	S. 17° E.	3.3	
					dyn.	3-20 ft.	3 30			13 shots.
					dyn.	5-20 ft.	8 30			27 shots.
		40.3			Luc. sdr. (a)					
84	85				9′ Tnr.; m. b.	botm.	28	S. 46° E.	2.0	
		44.3			Luc. sdr. (a)					
80	84				9′ Tnr.; m. b.	botm.	21	S. 56° W.	1.3	Net badly torn and Tanner beam lost.
		41.1			Luc. sdr. (a)					
84	82				9′ Tnr; m. b.	botm.	20	S. 53° W.	1.9	
		44.0			Luc. sdr. (a)					
83	84				9′ Tnr.; m. b.	botm.	33	N. 42° W.	.8	
					dyn.	8-20 ft.	2 15			13 shots.
		42.3			Luc. sdr. (a)					
85	85				9′ Tnr.; m. b.	botm.	21	S. 15° E.	1.5	
83	82				int. 4	surface.	11 35			Ship at anchor.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Sibuko Bay, Borneo, and vicinity—Continued.		1909.		*fms.*	
....	Mabul Id. (S)	H. O. 2117; June, 1903.	Sept. 29	7.00 a. m.	....	Co.
D. 5589	Mabul Id. (NW.) N. 3° W., 2.8 miles (4° 12′ 10″ N., 118° 38′ 08″ E.).	....do....	...do....	7.16 a. m. 7.44 a. m.	260	fne. gy. S., gy. M.
D. 5590	Mabul Id. (NW.) N. 22° W., 4.3 miles (4° 10′ 50″ N., 118° 39′ 35″ E.).	....do....	...do....	8.33 a. m. 9.02 a. m.	310	gn. M., S.
D. 5591	Mabul Id. (NW.) N. 6° W., 3.1 miles (4° 11′ 48″ N., 118° 38′ 20″ E.).	....do....	...do....	10.54 a. m.	260	
D. 5592	Silungan Id. (M.) N. 1° W., 6.4 miles (4° 12′ 44″ N., 118° 27′ 44″ E.).	....do....	...do....	3.33 p. m. 4.00 p. m.	305	gn. M.
D. 5593	Mt. Putri (sea tangent) Borneo, N. 52° W., 17.2 miles (4° 02′ 40″ N., 118° 11′ 20″ E.).	B. A. 2099; Apr., 1895.	...do....	7.25 p. m. 7.34 p. m.	38	fne. S.
....	Tawao River	B. A. 2576; Oct., 1882, cor. to Aug., 1905.	Sept. 30	9.30 a. m.	....	M., S
D. 5594	Mt. Putri (sea tangent) S. 82° E., 5.9 miles (4° 14′ 20″ N., 117° 53′ 12″ E.).	B. A. 2099; Apr., 1895.	...do....	7.24 p. m.	11	
....	Silimpopon River		Oct. 2	8.00 a. m.		
	Off Zamboanga, Mindanao, P. I.					
D. 5595	Zamboanga Lt. N. 31° W., 0.1 mile (6° 54′ 00″ N., 122° 04′ 30″ east).	C. S. 4645; July, 1907.	Oct. 6	7.13 p. m.	9	
D. 5596	....do	....do....	Oct. 10	6.00 p. m.	9	
D. 5597	....do	....do....	Oct. 12	11.45 a. m.	9	
D. 5598	....do	....do....	...do....	3.10 p. m.	9	
D. 5599	....do	....do....	...do....	6.20 p. m.	9	
	North of Celebes.					
D. 5600	Menado (town) S. 58° E., 68 miles (2° 05′ 00″ N., 123° 52′ 30″ E.).	H. O. 1727; Apr., 1909.	Nov. 7	7.06 p. m.		
....	Talisse Id., east	B. A. 930; May, 1866. cor. to May, 1907.	Nov. 9	6.00 a. m.	....	Co.
....	Limbe Strait, vicinity of Strait Id.		Nov. 10	4.30 p. m. 6.00 a. m. 1.00 p. m.	....	Co. S., Co. S., Co.
	Gulf of Tomini, Celebes.					
....	Kema (town)	B. A. 1727.	Nov. 13	8.45 a. m.	....	S.
D. 5601	Limbe Id. (NE.), N., 20.7 miles (1° 13′ 10″ N., 125° 17′ 05″ E.).	....do....	...do....	1.15 p. m. 2.18 p. m.	765	S., Glob., Ptr.
D. 5602	Gorontalo pier, N., 7.1 miles (0° 22′ 00″ N., 132° 03′ 30″ E.).	B. A. 942*a*; Oct., 1868; cor. to Mar., 1906.	Nov. 14	9.01 a. m. 10.15 a. m.	962	gy. M.
D. 5603	Gorontalo pier N. 6° W., 5.7 m. (00° 24′ 00″ N., 123° 03′ 45″ E.).	....do....	Nov. 15	1.12 p. m. 2.37 p. m.	803	S.
D. 5604	Bilatu (town), N. 26° W., 8.7 miles (0° 22′ 30″ N., 122° 42′ 30″ E.).	....do....	...do....	7.25 p. m.		
....	Dodepo and Pasejogo Ids.	B. A. 900; Mar., 1901; cor. to Mar., 1907.	Nov. 16	8.00 a. m.	....	Co.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					dyn.	7–25 ft.	5 00			15 shots.
		45.7			Luc. sdr. (a)					
81	82				9′ Tnr.; m. b.	botm	20	S. 49° E.	2.0	
		44.3			Luc. sdr. (a)					
82	83				9′ Tnr.; m. b.	botm	21	S. 55° E.	.21	
84	84				9′ Tnr	botm	21	S. 58° E.	1.8	Depth estimated from dredging wire angle.
		43.3			Luc. sdr. (a)					
83	85				9′ Tnr.	botm	10	N. 65° E.	.7	
					Tnr. sdr. (a)					
84	83				9′ Tnr.	botm	15	West	1.4	Frame badly bent.
					dyn.		8 30			
76	83				int. 4.	surface.	1 37			Ship at anchor. Net badly torn.
					dyn.		9 00			
80	80				int. 4.	surface.	10 50			Ship at anchor.
80	81				int. 4.	do.	12 30			Do.
83	82				int. 4.	do.	2 20			Do.
85	82				int. 4.	do.	3 00			Do.
84	82				int. 5.	do.	11 15			Do.
80	82				int. 4.	surface.	26			No bearings obtainable.
					dyn.	10–18 ft.	5 30			16 shots.
					dyn.	8–10 ft.	1 30			2 shots.
					dyn.	8–10 ft.	4 30			11 shots.
					dyn.	8–15 ft.	4 00			12 shots.
					380′ seine.	7 ft	2 00			2 hauls.
					Luc. sdr. (a)					
81	83				12′ Agz.; m. b.	botm	21	S. 29° E.	1.8	
					Luc. sdr. (a)					
81	84				12′ Agz.	botm	20	S.	2.0	Net torn; bridle ropes torn loose.
					Luc. sdr. (a)					
84	84				12′ Agz.	botm	13	E.	1.0	One bridle stop carried away.
83	83				int. 4.	surface.	25			No bearings obtainable.
					dyn.	8–20 ft.	4 00			18 shots.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Gulf of Tomini, Celebes—Con.		1909.		*fms.*	
D. 5605	Dodepo Id. (W.) N. 14° W., 5.9 miles (0° 21′ 33″ N. 121° 34′ 10″ E.).	B. A. 900; Mar., 1901; cor. to Mar., 1907.	Nov. 16	9.27 a. m. 10.25 a. m.	647	
	Papajatu (Celebes)	do	do	2.00 p. m.		M., Co
	Sadaa Id., north	do	Nov. 17	6.00 a. m.		Co., R., S.
D. 5606	Dodepo Id. (W.) N. 3° W., 10.8 miles (0° 16′ 28″ N., 121° 33′ 30″ E.).	do	do	9.09 a. m. 10.07 a. m.	834	gn. M.
	Binang Unang Id., east	B. A. 942*a*; Oct., 1868, cor. to Mar., 1906.	do	4.00 p. m.		Co., S
D. 5607	Binang Unang Id. (E.) S. 36° E., 5 miles (0° 04′ 00″ S., 121° 36′ 00″ E.).	do	Nov. 18	8.25 a. m. 9.20 a. m.	761	fne. S.
D. 5608	Binang Unang Id. peak, S. 87° E., 19 miles (0° 08′ 00″ S., 121° 19′ 00″ E.).	do	do	12.48 p. m. 2.02 p. m.	1,089	gy. M.
D. 5609	Binang Unang Id. (N) N. 80° E., 21 miles (00° 11′ 00″ S., 121° 16′ 00″ E.).	do	do	3.37 p. m. 4.51 p. m.	1,092	gn. M.
	Togian Bay, Togian Id.	do	Nov. 19	7.45 a. m.		Co.
D. 5610	Batu Daka Id. (S.) N. 87° W., 20.9 miles (0° 36′ 00″ S., 122° 01′ 00″ E.).	do	do	3.59 p. m. 4.50 p. m.	678	gy. M.
D. 5611	Buka Buka Id. (E.) S. 43° W., 6.4 miles (0° 40′ 30″ S., 121° 50′ 00″ E.).	do	do	7.14 p. m.		
D. 5612	Buka Buka Id. (E.) S. 3° E., 7 miles (0° 38′ 00″ S., 121° 45′ 40″ E.).	do	Nov. 20	6.04 a. m. 7.22 a. m.	750	
	Buka Buka Id., north	do	do	9.15 a. m.		Co.
D. 5613	Buka Buka Id. (E.) S. 28° 4 miles (0° 42′ 00″ S., 121° 44′ 00″ E.).	do	do	10.16 a. m. 11.14 a. m.	752	gy. M.
	Malibagu Pt. (Celebes)	do	Nov. 21	10 00 a. m.		Co.
	Molucca Passage.					
D. 5614	Tifori Id. (C.) N. 19° E., 30.5 miles (0° 31′ 00″ N., 125° 58′ 45″ E.).	B. A. 942*a*; Oct., 1868, cor. to Mar., 1906.	Nov. 22	6.44 a. m. 7.58 a. m.	1,100	gy. M., S., Glob.
D. 5615	Tifore Id. (C.) N. 40° W., 35 miles (0° 32′ 30″ N., 126° 31′ 30″ E.).	do	do	1.16 p. m. 2.37 p. m.	1,021	G.
D. 5616	Tifore Id. (C.) N. 62° W., 50 miles (0° 36′ 00″ N., 126° 52′ 20″ E.).	do	do	6.44 p. m.		
	Dodinga Bay, Gillolo Id.					
	Tidore Id., north	B. A. 942*a*; Oct., 1868, cor. to Mar., 1906.	Nov. 24	8.00 a. m.		Co.
	Maitara Id., north	do	Nov. 26	8.15 a. m.		Co.
D. 5617	Ternate Id. (SE.) S. 45° W., 7 miles (00° 49′ 30″ N., 127° 25′ 30″ E.).	do	Nov. 27	10.42 a. m. 11.01 a. m.	131	
H. 4934	Ternate Id. (SE.) S. 33° W., 7.8 miles (0° 51′ 00″ N., 127° 25′ 10″ E.).	do	do	11.37 a. m.	139	S., Lav

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Luc. sdr. (a)					
82	82				12′ Agz.	botm	21	S. 63° W.	1.7	Net slightly torn.
					dyn.	15–20 ft.	1			2 shots.
					dyn.	10–20 ft.	1			10 shots.
					Luc. sdr. (a)					
83	83				12′ Agz.	botm	20	S. 28° E.	2.5	
					dyn.	10–12 ft.	2			11 shots.
					Luc. sdr. (a)					
81	83				12′ Agz.	botm	20	S. 50° W.	1.5	
		36.3			Luc. sdr. (a)					
80	82				12′ Agz.	botm	20	S. 40° W.	3.5	
		36.3			Luc. sdr. (a)					
83	83				12′ Agz.	botm	33	S. 39° E.	2.0	
					dyn.	5–18 ft.	3 30			Do.
					Luc. sdr. (a)					
84	87				12′ Agz.	botm	27	N. 63° W.	2.0	
83	84				Int. 4	surface	20			
					Luc. sdr. (a)					
80	83				12′ Agz.	botm	22	S. 5° E.	1.5	Therm., sounding cup, stray line and lead, and 70 fms. wire lost.
					dyb.	5–15 ft.	3 00			21 shots.
					Luc. sdr. (c)					
85	84				12′ Agz.	botm	19	N. 20° E.	1.8	
					dyn.	10–20 ft.	1 30			7 shots.
					Luc. sdr. (c)					Shot failed to detach.
82	84				12′ Agz.	botm	12	N. W.	1.5	Bridle stop carried away; net torn.
					Luc. sdr. (c)					
84	84				12′ Agz.	botm	20	S. W.	1.5	
80	84				int. 4 §	20–30 fms.	18 2			
					dyn.	6–18 ft.	4 00			8 shots.
					dyn.	8–18 ft.	3 45			13 shots.
					Luc. sdr. (c)					
84	84				12′ Agz.	botm.	10	N. 71° W.	1.0	
					Tnr. sdr. (e)					

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Molucca Passage.					
			1909.		*fms.*	
D. 5618	Mareh Id., S. 69° E., 7.8 miles (0° 37′ 00″ N., 127° 15′ 00″ E.).	B. A. 942*a*; Oct., 1868, cor. to Mar., 1906.	Nov. 27	2.07 p. m. 2.44 p. m.	417	gy. M
D. 5619	Mareh Id. (S.) S. 78° E., 7 miles (0° 35′ 00″ N., 127° 14′ 40″ E.).	....do....	...do...	3.36 p. m. 4.12 p. m.	435	fne. gy. S., M
D. 5620	Makyan Id. (S.), S. 44° E., 7 miles (0° 21′ 30″ N., 127° 16′ 45″ E.).	....do....	Nov. 28	5.48 a. m. 6.24 a. m.	358	gy. M
	Between Gillolo and Makyan islands.					
....	Makyan Id. (SE.)	B. A. 942*a*. Oct., 1868; cor. to Mar., 1906.	Nov. 28	8.30 a. m.		S., Co
D. 5621	Makyan Id. (S.), N. 54° W., 3 miles (0° 15′ 00″ N., 127° 24′ 35″ E.).	....do....	...do...	9.21 a. m. 9.50 a. m.	298	gy. and bk. S. (m. b.)
....	Powati Anchorage (Makyan).	B. A. 912, Mar., 1885; cor. to Oct., 1906.	Nov. 29	6.00 a. m.		S., Co
D. 5622	Makyan Id. (NE.), N. 66° W., 4.1 miles (0° 19′ 20″ N., 127° 28′ 30″ E.).	B. A. 942*a*, Oct., 1868; cor. to Mar., 1906.	...do...	7.36 a. m. 8.03 a. m.	275	gy. M
D. 5623	Makyan Id. (S.), S. 88° W., 7.5 miles (0° 16′ 30″ N., 127° 30′ 00″ E.).	....do....	...do...	8.56 a. m. 9.22 a. m.	272	fne. S., M
D. 5624	Makyan Id. (S.), N. 67° W., 8.9 miles (0° 12′ 15″ N., 127° 29′ 30″ E.).	....do....	...do...	10.30 a. m. 10.58 a. m.	288	fne. S., M
	Between Gillolo and Kayoa islands.					
....	Kayoa Id. (northeast)	B. A. 942*a*, Oct., 1868; cor. to Mar., 1906.	Nov. 29	1.30 p. m.		Co
D. 5625	Kayoa Id. (SE.), S. 3° W., 6 miles (0° 07′ 00″ N., 127° 28′ 00″ E.).	....do....	...do...	1.49 p. m. 2.16 p. m.	230	gy. M., fne. S
D. 5626	Kayoa Id. (SE.), S. 5° W., 6.7 miles (0° 07′ 30″ N., 127° 29′ 00″ E.).	....do....	...do...	3.09 p. m. 3.34 p. m.	265	gy. M., fne. S
D. 5627	Kayoa Id. (SE.), S. 15° E., 4.5 miles (0° 06′ 00″ N., 127° 26′ 00″ E.).	....do....	...do...	.... 6.02 p. m.	22	M
	Patiente Strait and southward.					
D. 5628	St. Lamo Id. (SE.), N. 9° W., 7 miles (0° 28′ 30″ S., 127° 45′ 00″ E.).	B. A. 942*a*, Oct., 1868; cor. to Nar., 1906.	Nov. 30	11.22 a. m. 12.45 p. m.	1,291	gy. M
....	Gane (Gillolo)	B. A. 912.. Mar., 1885; cor. to Oct., 1906.	Dec. 1	8.00 a. m.		mrgn. Co., S
D. 5629	Doworra Id. (S.), S. 62° W., 6 miles (0° 50′ 00″ S., 128° 12′ 00″ E.).	B. A. 942*a*, Oct., 1868; cor. to Mar., 1906.	Dec. 2	6.14 a. m. 6.43 a. m.	205	co. S
....	Doworra Id. (south)	....do....	...do...	8.00 a. m.		Co

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

Temperatures. Air.	Temperatures. Surface.	Temperatures. Bottom.	Density. Surface.	Density. Bottom.	Apparatus.	Trial. Depth.	Trial. Duration.	Drift. Direction.	Drift. Distance.	Remarks.
°F.	°F.	°F.					h. m.		mi.	
....	....	......	....	....	Luc. sdr. (c)...	....	......	....	....	
82	84	......	....	....	12′ Agz........	botm...	20	S. 13° W..	2.0	
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
83	84	......	....	....	12′ Agz........	botm...	29	S. 22° E...	1.8	
....	....	......	....	....	Luc. sdr. (c)...	....	......	....	....	
80	82	......	....	....	12′ Agz........	botm...	21	South.....	1.0	
....	....	......	....	....	dyn...........	8–18ft..	3 00	....	....	17 shots.
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
81	84	......	....	....	12′ Agz.; m. b.	botm...	20	S. 28° E...	1.2	
....	....	......	....	....	dyn...........	10–20ft.	1 00	....	....	4 shots.
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
80	83	......	....	....	12′ Agz.; m. b.	botm...	21	S. 10° E...	1.0	
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
81	83	......	....	....	12′ Agz........	botm...	20	South.....	1.0	
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
83	83	......	....	....	12′ Agz........	botm...	20	S. 15° E...	1.5	
....	....	......	....	....	dyn...........	8–30ft..	3 00	....	....	20 shots.
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
83	84	......	....	....	12′ Agz........	botm...	21	S. 5° W...	1.8	
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
84	84	......	....	....	12′ Agz........	botm...	18	West......	1.0	
....	....	......	....	....	hand lead.....	....	......	....	....	
83	83	......	....	....	int. 4..........	5 fms...	11 40	....	....	Ship at anchor.
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	Stray line carried away.
86	84	......	....	....	12′ Agz........	botm...	20	S. 20° E...	2.5	One bridle stop carried away.
....	....	......	....	....	dyn...........	10–25ft.	7 00	....	....	24 shots.
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	
80	83	......	....	....	12′ Agz........	botm...	02	....	....	Dredge frame runner badly bent; lead rope broken; bridle stops lost.
....	....	......	....	....	dyn...........	10–20ft.	3 30	....	....	13 shots.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	South of Patiente Strait.		1909.		*fms.*	
D. 5630	Doworra Id. (N.), N. 3° W., 4.5 miles (0° 56′ 30″ S., 128° 05′ 00″ E.).	B. A. 942*a*, Oct., 1868; cor. to Mar., 1906.	Dec. 2	8.51 a. m. 9.36 a. m.	569	co. S., M
D. 5631	Doworra Id. (N.), N. 58° E., 10.5 miles (0° 57′ 00″ S., 127° 56′ 00″ E.).	do	do	1.11 p. m. 2.16 p. m.	809	gn. M. (in net)
D. 5632	Selang Pt. (Bachian Id.), N. 56° W., 12.5 miles (1° 00′ 00″ S., 127° 50′ 00″ E.).	do	do	4.12 p. m. 5.08 p. m.	845	
D. 5633	Selang Pt., N. 24° W., 11.8 miles (1° 03′ 00″ S., 127° 44′ 00″ E.).	do	do	7.14 p. m.		
	Pitt Passage.					
D. 5634	Gomomo Id. (E.), N. 41° E., 3 miles (1° 54′ 00″ S., 127° 36′ 00″ E.).	B. A. 942*a*, Oct., 1868; cor. to Mar., 1906.	Dec. 3	6.27 a. m. 7.02 a. m.	329	
	Gomomo Id. (S.)	do	do	8.15 a. m.		co. S
D. 5635	Gomomo Id. (E.), N. 14° W., 2.5 miles (1° 53′ 30″ S., 127° 39′ 00″ E.).	do	do	9.24 a. m. 9.56 a. m.	400	hrd Co., R., soapstone.
D. 5636	Gomomo Id (E.), N. 46° W., 6 miles (1° 55′ 00″ S., 127° 42′ 30″ E.).	do	do	11.51 a. m. 1.18 p. m.	1,262	gy. M., fne. S.
	Bouro Id. (south) and vicinity.					
	Uki Id	B. A. 942*a*; Oct., 1868, cor. to Mar., 1906.	Dec. 9	8.00 a. m.		mrgn. Co
	Uki River	do	do	8.00 a. m.		
	Uki Id	do	do	1.00 p. m.		S., R.
D. 5637	Amblau Id. (N.), N. 80° E., 21 miles (3° 53′ 20″ S., 126° 48′ 00″ E.).	do	Dec. 10	7.06 a. m. 7.57 a. m.	700	gy. M
	Tifu Bay (Bouro Id.)	do	do	1.00 p. m.		S., M., R., Co
H. 4935	Tifu Bay entrance (W.), N. 4° E., 2.2 miles (3° 46′ 15″ S., 126° 24′ 40″ E.).	do	do	1.30 p. m.	198	
D. 5638	Tifu Bay entrance (W.), N. 17° E., 3.2 miles (3° 47′ 15″ S., 126° 23′ 40″ E.).	do	do	2.00 p. m. 2.36 p. m.	517	fne. gy. S
	Tomahu Id	do	Dec. 11	1.00 p. m. 7.00 p. m.		Co., S
	Molucca Sea.					
D. 5639	Cape Pamali (Wowoni Id.), (N.), S. 77° W., 27 miles (3° 54′ 50″ S., 123° 27′ 20″ E.).	B. A. 3616; May, 1907.	Dec. 13	5.23 a. m. 7.11 a. m.	1,560	gy. M
	Buton Strait.					
D. 5640	Labuan Blanda Id., N. 88° E., 1 mile (4° 27′ 00″ S., 122° 55′ 40″ E.).	B. A. 3470; Apr., 1906.	Dec. 13	5.02 p. m. 5.10 p. m.	24	S., brk. Sh
	Labuan Blanda Id. (S.)	do	Dec. 14	6.00 a. m.		mrgn. Co
D. 5641	Kalono Pt. (W.), N. 61° W., 3.4 miles (4° 29′ 24″ S., 122° 52′ 30″ E.).	do	do	9.30 a. m. 9.41 a. m.	39	S., Sh
D. 5642	Tikola Peninsula (N.), N. 38° W., 6.5 miles (4° 31′ 40″ S., 122° 49′ 42″ E.).	do	do	10.50 a. m. 11.00 a. m.	37	gy. M
	Great Tobea Id	do	do	1.00 p. m.		S., Co
	Pendek Id., north	do	Dec. 15	3.15 p. m.		Co., S.
D. 5643	Pendek Id. (N.), S. 77° E., 1.7 miles (5° 11′ 45″ S., 122° 42′ 36″ E.).	do	do	3.42 p. m. 4.06 p. m.	215	gn. M

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					Luc. sdr. (c)					
82	84				12′ Agz	botm.	24	S. S. W.	1.8	
					Luc. sdr. (c)					Sounding cup lost.
84	86				12′ Agz	botm.	20	N. by W.	1.5	
					Luc. sdr. (c)					
83	85				12′ Agz	botm.	22	S. E. by E.	2.0	
82	84				int. 4	surface.	19			No bearings obtainable.
					Luc. sdr. (c)					
81	84				12′ Agz	botm.	13	S. W. by S.	1.0	
					dyn	6–20 ft.	7 30			23 shots.
					Luc. sdr. (c)					
82	83				12′ Agz	botm.	05	S. S. E.	.5	Bridle stops lost; frame bent.
					Luc. sdr. (c)					
83	83				12′ Agz	botm.	20	S. by E.	2.5	
					dyn	10–30 ft.	6 00			19 shots.
					dyn		9 00		7.0	
					75′ seine	12 ft.	3 30			9 hauls.
					Luc. sdr. (c)					
79	83				12′ Agz	botm.	12	S. 21° W.	1.3	Net fouled on bottom.
					dyn	2–20 ft.	3 15			18 shots.
					Luc. sdr. (c)					
					Luc. sdr. (c)					
84	86				12′ Agz	botm.	20	S. 78° E.	1.0	
					dyn	3–15 ft.	4 30			13 shots.
					dip; e. 1		1 30			
					Luc. sdr. (c)					
82	84				9′ Agz. rev	botm.	31	N. 36° W.	.8	
					Tnr. sdr. (e)					
84	84				12′ Agz	botm.	12	N. 52° W.	.3	
					dyn	5 ft.	1 45			5 shots.
					Tnr. sdr. (e)					
83	84				12′ Agz	botm.	17	S. 81° W.	.6	
					Tnr. sdr. (e)					
84	85				12′ Agz	botm.	17	N. 75° W.	1.4	
					dyn	5–18 ft.	3 30			11 shots.
					dyn	15–25 ft.	1 45			12 shots.
					Luc. sdr. (c)					
82	84				12′ Agz	botm.	17	S. 45° W.	.7	

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Buton Strait—Continued.					
			1909.		*fms.*	
D. 5644	Makasser Id. (E.), N. 4° E., 1.3 miles (5° 27′ 24″ S., 122° 38′ 00″ E.).	B. A. 3470; Apr.,1906.	Dec. 16	 8.02 a. m.	22	
D. 5645	North Id. (NE.), S. 10° W., 1.6 miles (5° 29′ 06″ S., 122° 36′ 06″ E.).	do	do	9.37 a. m. 9.54 a. m.	206	
D. 5646	North Id. (S.), S. 68° E., 7.5 miles (5° 31′ 30″ S., 122° 22′ 40″ E.).	B. A. 3616; May, 1907.	do	11.36 a. m. 12 10 p. m.	456	gn. M.
D. 5647	North Id. (S.), S. 87° E., 11.6 miles (5° 34′ 00″ S., 122° 18′ 15″ E.).	do	do	2.07 p. m. 2.44 p. m.	519	gn. M.
D. 5648	North Id. (S.), N. 87° E., 10.2 miles (5° 35′ 00″ S., 122° 20′ 00″ E.).	do	do	3.47 p. m. 4.29 p. m.	559	gn. M.
D. 5649	North Id. (S.), N. 87° E., 22 miles (5° 36′ 00″ S., 122° 07′ 36″ E.).	do	do	7.23 p. m.		
	Gulf of Boni.					
	Basa Id.	B. A. 3616; May, 1907.	Dec. 17	8.00 a. m.		Co. tide pools.
D. 5650	Lamulu Pt., N. 5° W., 12.5 miles (4° 53′ 45″ S., 121° 29′ 00″ E.).	do	do	8.34 a. m. 9.22 a. m.	540	gn. M.
D. 5651	Buginkali Pt., S. 67° E., 21 miles (4° 43′ 50″ S., 121° 23′ 24″ E.).	do	do	1.39 p. m. 2.32 p. m.	700	 gn. M.
D. 5652	Lamulu, S. 36° E., 7.5 miles (4° 35′ 00″ S., 121° 23′ 06″ E.).	do	do	4.39 p. m. 5.24 p. m.	525	gn. M.
D. 5653	Lamulu, S. 40° E., 18 miles (4° 27′ 36″ S., 121° 16′ 36″ E.).	do	do	7.23 p. m.		
D. 5654	C. Tabako, N. 17° E., 21.5 miles (3° 42′ 00″ S., 120° 45′ 50″ E.).	do	Dec. 18	5.41 a. m. 6.47 a. m.	805	
	Labuandata Bay	do	do	9.00 a. m.		Co., S.
D. 5655	C. Tabako, N. 7° E., 13 miles (3° 34′ 10″ S., 120° 50′ 30″ E.).	do	do	10.20 a. m. 11.00 a. m.	608	gy. M., fne. S.
H. 4936	C. Tabako, N. 47° E., 9 miles (3° 28′ 00″ S., 120° 45′ 40″ E.).	do	do	1.40 p. m.	667	gy. M.
D. 5656	Olang Pt., N. 67° W., 14.5 miles (3° 17′ 40″ S., 120° 36′ 45″ E.).	do	Dec. 19	7.36 a. m. 8.37 a. m.	484	gy. M.
D. 5657	Olang Pt., N. 61° W., 15.5 miles (3° 19′ 40″ S., 120° 36′ 30″ E.).	do	do	10.29 a. m. 11.08 a. m.	492	gy. M.
D. 5658	C. Loko Loko, S. 31° W., 12 miles (3° 32′ 40″ S., 120° 31′ 30″ E.).	do	do	1.38 p. m. 2.23 p. m.	510	gy. M.
D. 5659	C. Lassa, S. 78° W., 19 miles (5° 33′ 20″ S., 120° 47′ 10″ E.).	do	Dec. 20	6.10 a. m. 6.57 a. m.	702	S. M.
	Flores Sea.					
H. 4937	C. Lassa, S. 78° W., 20.5 miles (5° 32′ 50″ S., 120° 49′ 10″ E.).	B. A. 3616; May, 1907.	Dec. 20	8.12 a. m.	885	gy. M.
D. 5660	C. Lassa, S. 88° W., 20.5 miles (5° 36′ 30″ S., 120° 49′ 00″ E.).	do	do	9.14 a. m. 10.05 a. m.	692	gy. M., S.
D. 5661	C. Lassa, N. 21° E., 12.5 miles (5° 49′ 40″ S., 120° 24′ 30″ E.).	do	do	4.05 p. m. 4.24 p. m.	180	hrd.
D. 5662	Tana Keke Id. (W.), N. 17° W., 12.5 miles (5° 43′ 00″ S., 119° 18′ 00″ E.).	B. A. 2637, June, 1885; cor. to Oct., 1904.	Dec. 21	5.40 a. m. 6.12 a. m.	211	
	Tana Keke Id. (S.)	do	do	8.30 a. m.		Co.

Steamer Albatross in the Philippine Islands, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
					hand lead					
80	83				12′ Agz	botm	11	S. 81° W.	.4	
					Luc. sdr. (c)					
79	83				12′ Agz	botm	01	N. 34° W.	.7	
					Luc. sdr. (c)					
79	83				12′ Agz	botm	20	East	1.1	
					Luc. sdr. (c)					
83	83				12′ Agz	botm	20	S. 40° E.	1.0	
		39.2			Luc. sdr. (c)					
83	83				12′ Agz	botm	23	S. 55° E.	.8	
83	83				int. 4	surface	21			No bearings obtainable.
					dyn	12-20 ft.	3 00			10 shots.
					copper sulphate		3 00			
		40.1			Luc. sdr. (c)					
84	84				12′ Agz	botm	10	S. 45° W.	.7	Bridle stops carried away.
		38.7			Luc. sdr. (c)					Sounding cup carried away.
85	84				12′ Agz	botm	20	N. 11° W.	2.9	
		41.2			Luc. sdr. (c)					
84	84				12′ Agz	botm	20	N. 61° W.	2.1	
82	82				int. 4	surface	20			No bearings obtainable.
		38.3			Luc. sdr. (c)					
79	83				12′ Agz	botm	28	N. 1° W.	2.0	
					dyn	5-18 ft.	3 00			12 shots.
		39.2			Luc. sdr. (c)					
84	84				12′ Agz	botm	20	S. 45° E.	1.5	
					Luc. sdr. (c)					Therm. failed to register.
		41.2			Luc. sdr. (c)					
80	83				12′ Agz	botm	05	S. 41° W.	1.8	
		41.3			Luc. sdr. (c)					
82	84				12′ Agz	botm	20	S. 19° W.	2.0	
		41.2			Luc. sdr. (c)					
83	85				12′ Agz	botm	20	S. 35° E.	1.2	
		39.0			Luc. sdr. (c)					
83	82				12′ Agz	botm	21	S. 62° E.	1.0	
		38.2			Luc. sdr. (c)					
		39.2			Luc. sdr. (c)					
83	83				12′ Agz	botm	20	S. 58° E.	1.8	
		50.5			Luc. sdr. (c)					
86	83				12′ Agz	botm	03	N. 50° E.	1.1	Net torn below lead line.
		48.8			Luc. sdr. (c)					
82	83				12′ Agz	botm	20	West	1.8	No bottom specimen.
					dyn	9-18 ft.	2 45			16 shots.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

Station No.	Position.	Chart.	Date.	Time of day.	Depth.	Character of bottom.
	Macassar Strait.		1909.		*fms.*	
D 5663	Kapoposang Id. (E.), N. 11° E., 1.7 miles (4° 43′ 22″ S., 118° 57′ 35″ E.).	Dutch 123; Sept., 1901.	Dec. 27	7.20 p. m.	10	....
D. 5664	Kapoposang Lt., N. 66° E., 3.8 miles (4° 43′ 22″ S., 118° 53′ 18″ E.).	.....do.....	Dec. 28	9.09 a. m. 9.43 a. m.	400	hrd........
D. 5665	Kapoposang Lt., S. 40° E., 18.8 miles (4° 27′ 00″ S., 118° 44′ 60″ E.).	B. A. 2637; June, 1885, cor. to Oct., 1904.	...do....	1.51 p. m. 2.59 p. m.	1,008	M........
....	Libani Bay, Celebes (W.)...	.....do.....	Dec. 29	8.00 a. m.	....	Co........
D. 5666	Onkona Pt., S. 1° W., 11 miles (2° 54′ 30″ S., 118° 47′ 00″ E.).	.....do.....	...do....	8.39 a. m. 9.18 a. m.	272	gn. M........
D. 5667	Onkona Pt., S. 5° W., 11 miles (2° 56′ 00″ S., 118° 47′ 30″ E.).	.....do.....	...do....	9.55 a. m. 10.25 a. m.	367	gy. S., M........
D. 5668	Mamuju Id. (E.), S. 31° E., 10.6 miles (2° 28′ 15″ S., 118° 49′ 00″ E.).	.....do.....	...do....	3.41 p. m. 4.45 p. m.	901	gy. M........
D. 5669	Mamuju Id. (E.), S. 14° E., 18.5 miles (2° 19′ 30″ S., 118° 50′ 00″ E.).	.....do.....	...do....	7.25 p. m.	....	....
D. 5670	Chenoki Pt., S. 60° E., 40 miles (1° 19′ 00″ S., 118° 43′ 00″ E.).	B. A. 941b, Nov., 1867; cor. to Aug., 1907.	Dec. 30	7.03 a. m. 8.18 a. m.	1,181	gy. M........
D. 5671	Chenoki Pt., S. 31° E., 42.5 miles (1° 05′ 00″ S., 118° 56′ 00″ E.).	.....do.....	...do....	12.41 p. m. 1.45 p. m.	960	gy. M........
D. 5672	Dongala Lt., S. 80° E., 54 miles (0° 29′ 00″ S., 118° 51′ 00″ E.).	B. A. 2636; Apr., 1878, cor. to Apr., 1907.	..do....	7.26 p. m.	....	....
....	Birabirahan (west)..........	B. A. 941b; Nov., 1867, cor. to Aug., 1907.	Dec. 31	8.45 a. m.	....	Co........
	Trusan Tando Bulong, B. N. Borneo.		1910.			
....	Daisy Islet, 4° 27′ 53″ N., 118° 38′ 25″ E.	H. O. 2117; June, 1903.	Jan. 6	1.45 p. m.	....	Co........
	Sulu Sea.					
....	Doc Can Id., southwest......	C. S. 4722..	Jan. 7	10.15 a. m.	....	S., Co........
	China Sea.					
....	Kwa Siang Bay, Formosa...	....	Jan. 25	8.30 a. m.	....	....
....	So Wan Bay, Formosa......	....	Jan. 29	7.30 a. m.	....	....

Steamer Albatross in the Philippine Islands, 1907-1910—Continued.

Temperatures.			Density.		Apparatus.	Trial.		Drift.		Remarks.
Air.	Surface.	Bottom.	Surface.	Bottom.		Depth.	Duration.	Direction.	Distance.	
°F.	°F.	°F.					h. m.		mi.	
83	84	......	....	....	hand line.....	....	......	....	....	
					int. 4..........	surface.	10 40	....	....	Ship at anchor.
....	....	43.3	....	....	Luc. sdr. (c)..	....	......	....	....	
81	84	......	....	....	12′ Agz........	botm...	21	S. 67° W..	2.5	No bottom sample in net.
....	....	......	....	....	Luc. sdr. (c)..	....	......	....	....	No bearings obtainable.
80	82	......	....	....	12′ Agz........	botm...	05	SW.......	2.0	Entire net carried away on bottom
....	....	......	....	....	dyn...........	6–18 ft..	3 30	....	....	20 shots.
....	....	47.5	....	....	Luc. sdr. (c)..	....	......	....	....	
80	82	......	....	....	12′ Agz........	botm...	12	S. 34° E...	1.5	
....	....	41.7	....	....	Luc. sdr. (c)..	....	......	....	....	
82	83	......	....	....	12′ Agz........	botm...	20	N. 34° W..	1.5	
....	....	38.2	....	....	Luc. sdr. (c)..	....	......	....	....	
81	83	......	....	....	12′ Agz........	botm...	19	S. 47° E...	2.8	Shot did not detach.
83	84	......	....	....	int. 4..........	surface.	24	North.....	1.0	
....	....	38.2	....	....	Luc. sdr. (c)..	....	......	....	....	Shot did not detach.
82	82	......	....	....	12′ Agz........	botm...	20	South.....	2.0	One bridle stop parted.
....	....	38.2	....	....	Luc. sdr. (c)..	....	......	....	....	
83	84	......	....	....	12′ Agz........	botm...	23	S. 63° E...	2.0	
82	83	......	....	....	int. 4..........	surface.	20	N. 10° W..	....	No bearings obtainable.
....	....	......	....	....	dyn...........	10–20 ft.	2 15	....	....	12 shots.
....	....	......	....	....	dyn...........	10–15 ft.	45	....	....	6 shots.
....	....	......	....	....	dyn...........	10–30 ft.	1 00	....	....	10 shots.
....	....	......	....	....	dyn...........	10–25 ft.	3 00	....	....	13 shots.
....	....	......	....	....	dyn...........	10–30 ft.	3 30	....	....	27 shots.

CONDITION AND EXTENT OF THE NATURAL OYSTER BEDS OF DELAWARE

By H. F. Moore
Assistant, U. S. Bureau of Fisheries

Bureau of Fisheries Document No. 745

CONTENTS.

CONDITION AND EXTENT OF THE NATURAL OYSTER BEDS OF DELAWARE.

By H. F. Moore,
Assistant, United States Bureau of Fisheries.

INTRODUCTION.

At the solicitation of the Delaware Oyster Survey Commission the Bureau of Fisheries during the summer of 1910 undertook a survey of the natural oyster beds of Delaware Bay within the jurisdiction of the State of Delaware. The State, which was making a survey of the planted beds under the supervision of Mr. C. C. Yates, of the United States Coast and Geodetic Survey, furnished the triangulation and made a small appropriation for the payment of two temporary employees during part of the work, but the Bureau of Fisheries furnished all other personnel, in addition to launches, boats, and equipment.

The steamer *Fish Hawk* was detailed for the work from June 1 to July 10, though, owing to unexpected delays in securing a launch able enough for the execution of hydrography in the open waters of the bay, she did not actually reach the field of operations until June 18. Part of the civilian personnel was ordered to the ship on May 26, in order to have the equipment in readiness for the anticipated commencement of work on June 1, on which date the entire party was assembled.

The purpose of the survey was the accurate location and charting of the natural oyster beds and the investigation of their present condition and productiveness. No previous survey or investigation of the beds of this region has been made, and although their approximate location is known to the local oystermen with reference to certain more or less indefinable natural landmarks, it is difficult for them to indicate, even roughly, their general position on the charts. Concerning some of the beds, and especially the southern extension of Flogger bed, the information obtained from the various sources was extremely contradictory.

METHODS OF THE SURVEY.

The methods employed were those pursued in former surveys of like character, and are explained in detail in a description of the beds of the James River,[1] from which some of the following is repeated:

A "boat sheet" was prepared, on which were accurately platted the positions, as determined by triangulation, of lighthouses and the towers erected as shore signals. These data were furnished by the State and were based on a development of the triangulation employed in the survey of the planted or leased beds.

The oyster beds were discovered by soundings with a lead line, but principally by means of a length of chain dragged over the bottom at the end of a copper wire running from the sounding boat. The wire was wound on a reel and its unwound length was adjusted to the depth of water and the speed of the launch, so that the chain was always on the bottom. Whenever the chain touched a shell or an oyster the shock or vibration was transmitted up the wire to the hand of a man whose sole duty it was to give heed to such signals and report them to the recorder.

The launches from which the soundings were made were run at a speed of between 3 and 4 miles per hour, usually on ranges ashore to insure the rectitude of the lines. At intervals of three minutes—in some cases two minutes—the position of the boat was determined by two simultaneous sextant observations of the angles between a set of three signals, the middle one of which was common to the two angles, the position being immediately platted on the boat sheet. At regular intervals of twenty seconds, as measured by a clock under the observation of the recorder, the leadsman made a sounding and reported to the recorder the depth of water and the character of the bottom, immediately after which the man at the wire reported the character of the chain indications since the last sounding—that is, whether they showed barren bottom or dense, scattering, or very scattering growths of oysters.

With the boat running at 3 miles per hour the soundings were between 80 and 90 feet apart, and, as the speed of the boat was uniform, the location of each was determinable within a yard or two by dividing the platted distance between the positions determined by the sextant by the number of soundings. The chain, of course, gave a continuous indication of the character of the bottom, but the record was made at the regular twenty-second intervals observed in sounding.

The chain, while indicating the absence or the relative abundance of objects on the bottom, gives no information as to whether they are shells or oysters, nor, if the latter, their size and condition. To obtain these data it was necessary to supplement the observations

[1] Moore, H. F.: Condition and extent of the oyster beds of James River, Virginia. Bureau of Fisheries Document No. 729.

already described by others more definite in respect to the desired particulars. Whenever, in the opinion of the officer in charge of the sounding boat, such information was required, a numbered buoy was dropped, the time and number being entered in the sounding book. Another launch, following the sounding boat, anchored alongside the buoy, and a quantity of the oysters and shells were tonged up, separated by sizes, and counted.

This boat at each station made a known number of "grabs" with the oyster tongs, exercising care to clean the bottom of oysters as thoroughly as possible at each grab. In a given depth of water and using the same boat and tongs, an oysterman will cover practically the same area of the bottom at each grab, but, other factors remaining the same, the area of the grab will decrease with an increase in the depth.

Careful measurements were made and tabulated showing the area per grab covered by the tonger employed on the work at each foot of depth of water and for each pair of tongs and boat used. With these data, and knowing the number of "grabs," the number of oysters of each size per square yard of bottom was readily obtainable by simple calculation. The following example will illustrate the data obtained and the form of the record:

DEPARTMENT OF COMMERCE AND LABOR.

BUREAU OF FISHERIES.

FIELD RECORD OF EXAMINATIONS OF OYSTER BEDS.

General locality, *Delaware Bay, Delaware.*
Local name of oyster ground, *Over-the-Bar.*
Date, *July 9, 1910.* Time, *8.50 a. m.*
Angle, *B 146–B 147.* Buoy *No. 6.*
Depth, *18 feet.* Bottom, *soft.*
Condition of water, *clear.*
Density, *1.008.* Temperature, *25° C.*
Current, ... Stage of tide, *one hour flood.*
Tongman, *M. A. Duffield.*
No grabs made, *8.* Tongs, *20 feet.*
Total area covered, *2.5* sq. yds.
No oysters taken {*1 in., 13. 1 in.–3 in., 129.* / *3 in.–4 in., 59. 4 in., 11.*}
Quantity shells, *14.*
Result {Spat per square yard, *5.2.* / Culls per square yard, *51.6.* / Counts per square yard, *28.0.*}

This furnishes an exact statement of the condition of the bed at a spot which can be platted on the chart with error in position of not more than a few yards. From the data obtained a close estimate may be formed of the number of bushels of oysters and shells per acre in the vicinity of the examination and, by multiplying the observations, for the bed as a whole. In the course of the survey 590 observations were made at various places, principally on the natural rocks, but some on the barren bottoms also.

In estimating the relative productiveness of the bottoms it appeared advisable to depart from the methods employed in the James River survey on account of the difference in the conditions under which the industry is prosecuted. Where tongs are used exclusively, a bed with a given quantity of oysters lying in shoal water is more valuable, commercially, than one with the same quantity of oysters in deep water, owing to the fact that the labor of the tonger is more efficient on the former. As has been pointed out, the area covered by a "grab" decreases with the depth, other factors being the same, and moreover the deeper the water the greater is the labor involved in making the grab and the smaller is the number of grabs which can be made in a given time.

In Delaware Bay, while there is a certain amount of tonging during the fall and at such times as the weather will permit in winter and early spring, the most important and productive fishing is by means of dredges, the use of which is permitted from April 15 to June 30, inclusive. In dredging, the effects of varying depths of water, within reasonable limits, are practically negligible so far as the catch is concerned. The time required for winding in from deep water is greater than from shallow water, but as the dredge is approximately equally efficient whatever the depth, and as the difference in the time required in winding is small as compared with the period during which the dredge is on the bottom, the factor of depth, so important in tonging, is practically inconsiderable.

The classification adopted in this report is as follows:

Depleted bottom	Less than 25 bushels per acre.
Very scattering growth	Between 25 and 75 bushels per acre.
Scattering growth	Between 75 and 150 bushels per acre.
Dense growth	Over 150 bushels per acre.

As the region is important for the production of seed rather than market oysters, all sizes are included in the estimates of the density of oyster growth, but all loose shells and other debris commonly dredged are excluded. "Depleted bottom" is not necessarily that which was formerly productive but now practically barren, but is merely an expression of the present impoverishment of the bed without respect to its past. In some cases it may be a formerly barren area slowly coming into productiveness.

The bottom rated as bearing a "very scattering growth" is the least productive bottom capable of furnishing a livelihood to the dredgers.

In the course of the survey 16,435 acres, or over 25 square miles, were explored with sounding lines and chains. Of this area 2,144 acres were found to be included in oyster beds of varying degrees of productiveness. In the survey the chain was dragged over 124 miles of the bottom, soundings were made at 5,772 places, and the position of the boat was instrumentally determined at 819 points.

DESCRIPTION OF OYSTER GROUNDS.

BOMBAY BED.

This is the northernmost public oyster bed within the confines of Delaware. Its northern limit is opposite the upper pier at Woodland Beach, and its southern end is a little below the small creek known locally as Tombstone. Its inner or southwestern edge is from 200 to 400 yards from shore, the average width of the bed is about one-fourth mile, and the total length slightly in excess of 1 mile.

The estimated area, density of growth, and contents of the bed are as follows:

OYSTER GROWTH ON BOMBAY BED.

Character of oyster growth.	Area.	Oysters per acre.			Estimated content of oysters.
		Under 3 inches.	Over 3 inches.	Total.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Dense	111	250	115	.365	40,515
Scattering	12	103	23	126	2,512
Very scattering	6	22	5	27	162
Depleted	26	0	0	0	0
Total	155				43,189

The dense area comprises a broad strip running along the entire inshore edge of the bed. The scattering areas are two, the larger lying near the middle of the outer edge of the bed and the smaller, a very narrow strip, on the offshore edge of the lower end. Both merge more or less gradually into the dense area with which they are continuous. The area of very scattering growth is a small patch situated near the offshore part of the upper end of the bed, in the midst of the depleted bottom. The latter appears to be a formerly moderately productive area which has become covered by a deposit of mud and now produces no oysters, although there are numerous buried shells lying on a hard bottom about 6 inches beneath the present surface. This bed differs from all others of the region treated in this report in being founded on a stony bottom, a considerable proportion of the oysters taken being attached to rock fragments. The oysters are in small clusters, with thin, sharp shells. Small oysters predominate, not only numerically but by measure. No drills were found and, reasoning from the low salinity of the water, probably do not occur. The specific gravity of the water at the time of examination, July 10, 1910, was about 1.005, and it is likely that the bed suffers periodically during freshets. The average depth of water is about 8 to 10 feet.

It was reported that there were oysters between the piers, but none were found, although there were a few attached to the piling and lying on the bottom in its vicinity.

The details of the examination of this bed are shown in the following table:

DETAILS OF EXAMINATIONS OF BOMBAY BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
183	July 10	10	Dense	1.6	35.2	2.6	129	26	155
184	do	10	do	10.5	42.0	12.6	184	126	310
189	do	10	do	11.0	65.8	19.5	269	195	464
191	do	11	do	15.8	34.2	3.2	175	32	207
192	do	10	do	28.4	54.2	20.5	299	205	504
195	do	12	do	9.5	17.9	9.5	96	95	191
197	do	12	do	52.0	58.4	13.7	387	137	524
199	do	11	do	74.2	57.4	10.0	461	100	561
194	do	12	Scattering	11.0	12.6	3.7	83	37	120
198	do	12	do	35.2	0.0	1.0	123	10	133
186	do	10	Very scattering	0.0	6.3	0.5	22	5	27
185	do	11	Depleted	0.0	0.0	0.0	0	0	0
187	do	10	do	0.0	0.0	0.0	0	0	0
188	do	10	do	0.0	0.0	0.0	0	0	0
190	do	11	do	0.0	0.0	0.0	0	0	0

THRUM-CAP BED.

For a distance of about 5 miles below Bombay bed the bottom is reported to be barren, with the possible exception of a few patches of insignificant size, and it was not deemed warrantable to incur the expense of an examination.

Thrum-cap bed is a somewhat triangular area lying about 1 mile offshore opposite the small stream known to the oystermen as Hay Ditch. It covers an area of about 78 acres, of which it is estimated 6 are covered by a dense growth, 14 by scattering, and 55 by very scattering, and 3 acres are characterized by a total absence of oysters, but with scattered shells buried in the mud.

The areas of dense and scattering growth form a narrow strip on the inshore edge of the bed, with the denser area at the upper end. The bottom covered with very scattering growth stretches in gradually decreasing productiveness from the outer edge of this strip toward the deeper water. The depleted area is a small patch where the dense growth shades off into the surrounding barren bottom. The depth of water on the bed varies from about 18 feet at the inshore edge to 22 feet on the outer border.

It is estimated that the bed contained at the time of examination 4,195 bushels of oysters of all sizes, of which the dense area bore 1,164 bushels, the scattering 1,106 bushels, and the very scattering 1,925 bushels.

There were comparatively few dead oysters, and no indications of the presence of drills were observed. In July the specific gravity of the water varied from about 1.003 at low water to 1.011 at high tide.

The results of the examinations of this bed are shown in the following table:

DETAILS OF EXAMINATIONS OF THRUM-CAP BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
179	July 9	19	Dense	4.4	28.4	8.0	114	80	194
181	...do	20	Scattering	5.5	12.2	1.7	62	17	79
178	...do	22	Very scattering	1.7	3.3	1.7	18	17	35
180	...do	19	Depleted	0.0	0.0	0.0	0	0	0

OVER-THE-BAR BED.

This bed, like the preceding, from which it is separated by a distance of a little over one-eighth of a mile, lies just beyond the edge of the shifting sands, which extend to about the 12-foot curve. It is about 1½ miles from shore, and takes its name from its position some distance outside of a long sand bar, which, according to the navigational charts, is covered by about 4 feet of water at low tide, but on which the present survey found water a little deeper. The depth on the bed itself varies from 15 to 20 feet.

The extent and general condition of the bed in July, 1910, is shown in the following table:

OYSTER GROWTH ON OVER-THE-BAR BED.

Character of oyster growth.	Area.	Oysters per acre.			Estimated content of oysters.
		Under 3 inches.	Over 3 inches.	Total.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Dense	109	103	162	275	29,975
Very scattering	15	41	0	41	615
Depleted	39	0	0	0	0
Total	163				30,590

The dense growth is found on two areas, 41 and 68 acres in extent, respectively, separated by a depleted area containing nothing but buried shells. The upper area is long and narrow and contains a large preponderance of oysters over 3 inches long. The northern end of the lower area is similar, with four or five times as many large oysters as small ones, but in the southern the two are in approximately equal quantity, and the average of both sizes is about 335 bushels per acre. The area of very scattering growth is found at the inshore edge of the southern part of the bed, and was apparently formed by a recent strike on a previously depleted area. The three depleted areas lie at the ends and the middle of the bed, the latter in reality separating the rock into two distinct parts. The depleted

bottom bears no oysters and but few exposed shells and, apparently, has been formed either by the silting of sparsely productive bottom or by shells dragged by dredging from the rock on to the adjacent muddy bottom.

The oysters throughout the entire bed are long, narrow, sharp-edged, and inferior in quality, and are almost invariably in clusters, whose bases are buried in soft mud. The bottom throughout is soft, and there is apparent nowhere any depth of shell deposits such as are found on Silver bed and the Ridge.

The details of the examinations made on this bed are shown in the following table:

DETAILS OF EXAMINATIONS OF OVER-THE-BAR BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
169	July 9	18	Dense	15.2	28.8	14.8	154	148	302
170	...do...	18	....do	12.0	28.0	8.4	140	84	224
171	...do...	18	....do	5.2	51.6	28.0	198	280	478
172	...do...	20	....do	9.2	5.6	10.4	52	104	156
174	...do...	19	....do	0.8	9.2	15.6	35	156	191
177	...do...	21	....do	5.6	6.1	26.1	41	261	302
167	...do...	17	Very scattering	0.8	10.8	0.0	41	0	41
168	...do...	18	Depleted	0.0	0.0	0.0	0	0	0
173	...do...	20	....do	0.0	0.0	0.0	0	0	0
176	...do...	20	....do	0.0	0.0	0.0	0	0	0
182	...do...	21	....do	0.0	0.0	0.0	0	0	0

PATCHES BETWEEN OVER-THE-BAR AND SAND BEDS.

In the area between these beds are several small scattered patches of oysters, but two of which were examined to determine their character. One of these has an area of about 16 acres and is estimated to contain about 1,000 or 1,200 bushels of oysters. The other is about 5 acres in extent and contains probably about 200 bushels of oysters. On both beds and probably on other small patches in the vicinity the oysters are long, thin, and narrow, and are found in scattered clusters.

The following table exhibits the data obtained from the examinations:

DETAILS OF EXAMINATIONS OF PATCHES BETWEEN OVER-THE-BAR BED AND SAND BEDS.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
160	July 8	19	Very scattering	0	2.8	3.2	10	32	42
162	...do...	15	....do	0	3.0	6.3	11	63	74

SAND BED.

Sand bed lies nearly north of the Ridge and northeast of Silver bed, being separated from the latter by a distance of about one-third of a mile. It covers an area of about 54 acres, of which 16 acres are covered by a dense growth of oysters and 11 acres by a scattering growth, the remaining 27 acres being depleted.

The productive bottom forms a zone along the inner edge of the bed, the southern and middle portions bearing the denser growth. The depleted bottom occupies the outer half of the bed. It is estimated that the bed contained about 4,600 bushels of oysters of all sizes at the time of examination, and that of these 3,700 bushels were on the area of dense growth, 700 bushels on the very scattered growth, and 200 bushels on the depleted bottom. Oysters over 3 inches long preponderated on the productive portions of the bed, but were inferior in quantity on the depleted area.

The oysters are superior in shape to those found on the bars north of this, being in smaller clusters and rounder. Dead oysters were comparatively few, and no indications of the drill were noted.

Several boats were observed working on Sand bed during the latter part of June, and it is reported that the bed was dredged to some extent earlier in the season.

The following examinations were made:

Details of Examinations of Sand Bed.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
154	July 8	20	Dense	1.2	24.4	14.4	90	144	234
159	...do	19	Very scattering	4.0	1.2	4.8	18	48	66
155	...do	18	Depleted	0.0	0.0	0.0	0	0	0
156	...do	19	.....do	0.4	2.4	0.4	10	4	14
157	...do	19	.....do	1.6	....	0.4	6	4	10

LEIPSIC ROCK.

This is a small but exceedingly prolific bed lying in the mouth of Leipsic Creek within one-eighth of a mile of the shore. It is approximately circular in outline and consists of about 4 acres of very dense growth. It is estimated that the bed bears nearly 3,000 bushels of oysters, practically none of which is over 3 inches in length, and it is probable that it represents a recent rejuvenescence of an old bed. There is a deep deposit of shells forming the core of the bed, but around the edges this is covered by a deposit of mud which appears to be encroaching on and causing a gradual contraction of the productive area. It is probable that the oysters are subject to periodical destruction from fresh water and mud carried by freshets.

So far as could be learned the rock has not been worked for several years.

The following examinations were made:

DETAILS OF EXAMINATIONS OF LEIPSIC ROCK.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
140	July 7	11	Dense	41.0	114.5	1.4	544	14	558
144	...do	12	.....do	0.0	14.8	0.4	52	4	56
145	...do	10	.....do	118.0	300.0	1.6	1,460	16	1,476

BED NORTH OF SILVER BED.

North of the western end of Silver bed and separated from it by about one-eighth of a mile of soft bottom in which scattering shells are buried is a nameless bed covering about 25 acres. There are about 8 acres covered by scattering growth estimated to contain about 900 bushels of oysters and about 17 acres of very scattering oysters containing about 750 bushels. The northern part of the bed, which bears the heaviest growth, has a substratum of shells, but the southern edge lies on sandy bottom. The proportion of large oysters is greater than on Silver bed.

The following observations were made:

DETAILS OF EXAMINATIONS OF BED NORTH OF SILVER BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
158	July 8	14	Scattering	4.5	6.7	7.8	39	78	117
152	...do	13	Very scattering	4.0	2.2	2.2	22	22	44

BETWEEN SILVER BED AND SIMONS CREEK.

Almost continuous with Silver bed and stretching for a distance of nearly one-half of a mile toward the mouth of Simons Creek is a bed of about 17 acres lying on the mud and sand. Its most productive area is nearest Silver bed, and the opposite end is bare except of scattered shells. The best part, about 5 acres in extent, bears a scattering growth of oysters estimated to contain about 375 bushels, and the area of very scattering growth which adjoins it bears about the same quantity on its 7 acres. The depleted bottom is practically bare at present, but is in a condition to catch a small set under favorable conditions.

The following table shows the results of examinations:

DETAILS OF EXAMINATIONS OF BED BETWEEN SILVER BED AND SIMONS CREEK.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
166	July 8	9	Scattering	2.9	3.4	5.4	22	54	76
165	...do....	9	Very scattering	0.0	4.3	3.7	15	37	52
111	June 29	14	Depleted	0.0	0.0	0.0	0	0	0

SILVER BED.

This bed, which is said to derive its name from the silvery color of the shells found on the hard rock, is, excepting the Ridge, the largest and most important natural bed in Delaware. It lies about 1 mile east of the mouth of Dona River, locally known as Simons Creek. The bed has a maximum extent of about a mile east and west and slightly over a half mile north and south, and it lies in a depth of water varying from 8 to 12 feet.

The following table shows its general extent and condition in July, 1910:

OYSTER GROWTH ON SILVER BED.

Character of oyster growth.	Area.	Oysters per acre.			Estimated content of oysters.
		Under 3 inches.	Over 3 inches.	Total.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Dense	65	171	74	245	15,925
Scattering	20	82	27	109	2,180
Very scattering	45	25	21	46	2,070
Depleted	140	8	2	10	1,400
Total	270				21,575

The most productive parts of the bed lie in its northeast half and include a belt of dense and scattering growth about one-half mile long and varying from one-eighth to one-third mile in width.

A considerable part of the bottom covered by the bed is macadamized with a dense accumulation of shells, or probably two such areas separated by a belt of muddy bottom. In places the bottom was so hard with compacted shells and so smooth that a boat anchor would not take hold. Although this bed is not now raised above the surrounding barren bottom, it is probable that it originally formed a knoll, the crest of which has been cut away by dredging and tonging.

The area of dense growth lies in a compact body occupying the middle of the eastern half of the bed, gradually merging with two

small areas of scattering growth at the northwest and southeast ends, respectively. There is a third area of scattering growth near the western end of the bed. The very scattering growth forms a zone around the western and part of the southern side of the more prolific bottom, lying on a substratum of compacted shells. Most of the western half of the bed is composed of depleted bottom, which also extends as a narrow strip around practically the entire circumference of the rest of the bed, the bottom being generally hard and shelly with occasional patches of mud.

In general the present condition of the bed indicates a former greater extent of productive bottom. There is every indication that it has been closely dredged during the past season, and the present content of oysters is probably but a small proportion of the quantity on the bottom at the beginning of the season. The shells are in excellent condition to receive a set of spat, and under favorable circumstances the bed should speedily recuperate. There were comparatively few dead oysters, and drills or borers do not appear to be troublesome.

The following observations were made:

DETAILS OF EXAMINATIONS OF SILVER BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
58	June 25	14	Dense	23.7	65.0	12.2	310	122	432
110	June 29	14	do	5.9	21.1	6.7	94	67	161
149	July 8	13	do	1.5	29.6	7.8	109	78	187
163	do	10	do	8.7	40.0	2.9	170	29	199
55	June 25	14	Scattering	12.2	7.4	1.9	69	19	88
147	July 8	14	do	1.4	22.2	3.3	83	33	116
164	do	9	do	4.3	22.9	2.9	95	29	124
59	June 25	13	Very scattering	0.4	3.3	1.2	13	12	25
100	June 27	11	do	2.4	7.9	1.7	36	17	53
150	July 8	13	do	2.6	4.5	3.3	25	33	58
52	June 25		Depleted						
53	do	13	do	0.3	4.5	0.0	17	0	17
60	do	13	do	0.0	0.0	0.0	0	0	0
98	June 27	11	do	0.0	2.8	0.3	10	3	13
99	do	11	do	1.4	1.0	0.7	8	7	15
109	June 29	14	do	0.0	0.0	0.0	0	0	0
148	July 8	13	do	1.1	2.2	0.0	11	0	11

LUMPS BETWEEN SILVER AND RIDGE BEDS.

Lying between Sand and Silver beds on the north and Ridge and Drum beds on the south are a number of small lumps and patches surrounded by a considerable area of barren bottom. Eight of these areas were located by the survey, most of them covering areas of 3 or 4 acres, and there are probably a number of others, as on account of their small size and irregular distribution but little time was spent in

looking for them. But three of these places were examined in detail, and their location may be determined by an inspection of the chart. One of them was about 3 acres in extent and was estimated to contain about 2,500 bushels of long, sharp-edged oysters in large clusters, growing on a soft, muddy bottom. The other two spots examined bore a very scattering growth. The largest of these, about one-fourth mile inshore of the upper end of Drum bed, was estimated to be about 8 acres in extent and to contain about 300 bushels of oysters. The other, just south of the middle of Silver bed, has an area of about 4 acres and contained at the time of examination about 120 bushels of oysters.

The five areas located but not examined varied in extent from about 1 to 14 acres, and are situated variously. They are shown on the chart as unshaded places surrounded by red lines. Judging from the chain readings none of them is particularly productive.

The following observations were made in this region:

DETAILS OF EXAMINATIONS OF LUMPS BETWEEN SILVER AND RIDGE BEDS.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	Feet.		No.	No.	No.	Bu.	Bu.	Bu.
96	June 27	18	Dense	1.4	28.0	75.2	103	752	855
86	...do...	15	Very scattering	0.7	4.1	1.9	17	19	36
97	...do...	13	.....do	0.0	2.2	2.2	8	22	30

DRUM BED.

Drum bed lies west of and very close to the depleted edge of the ridge and about 1 mile from shore. It has a length of over one-half mile, a width of about one-fourth mile, and a total area of approximately 68 acres. Its condition and the relative extent of oyster growths of the several degrees of productiveness are shown in the following table:

OYSTER GROWTH ON DRUM BED.

Character of oyster growth.	Area.	Oysters per acre.			Estimated content of oysters.
		Under 3 inches.	Over 3 inches.	Total.	
	Acres.	Bushels.	Bushels.	Bushels.	Bushels.
Dense	16	139	83	222	3,552
Scattering	21	30	65	95	1,995
Very scattering	19	32	18	50	950
Depleted	12	1	6	7	84
Total	68				6,581

The most prolific part of the bed is an area about one-fourth mile square extending across its middle, consisting of an area of dense growth flanked on each side by one bearing a scattering growth. The northern end of the bed is composed of a gradually narrowing area of very scattering growth, and there is a small patch of similar character at the inside corner of the southern end.

The depleted bottom is in two patches, one adjoining the scattering and very scattering growths at the lower end and the other interposed between the dense scattering and very scattering oyster deposits just above the middle. The bottom is soft on the areas of very scattering growth and on part of the northernmost depleted area, but is elsewhere hard and shelly.

Small oysters exceed in quantity those over 3 inches long, excepting on the area of scattering growth, where there are about twice as many large as small ones. Loose shells are in fair abundance and of a character to catch a good set under favorable conditions.

The following observations were made:

DETAILS OF EXAMINATIONS OF DRUM BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
47	June 25	16	Dense	27.2	18.8	3.6	161	36	197
48	...do....	16½	.....do	16.0	30.0	7.6	161	76	237
107	June 29	17	.....do	4.0	23.2	13.6	95	136	231
51	June 25	17	Scattering	7.2	13.2	3.2	71	32	103
84	June 27	17	.....do	1.4	10.0	8.2	4	82	86
106	June 29	18	.....do	1.6	2.8	8.2	15	82	97
105	...do....	18	Very scattering	1.6	9.2	1.6	37	16	53
108	...do....	17	.....do	0.0	7.6	2.0	27	20	47
73	June 27	15	Depleted	0.0	0.4	0.4	1	4	5
85	...do....	17	.....do	0.0	0.0	0.8	0	8	8

RIDGE BED.

The Ridge bed, known to the oystermen as "The Ridge," is at present the most important natural bed in Delaware, and during the period of the present survey it sustained by far the heaviest dredging. During the latter half of June numerous vessels were at work daily and until the end of the month, when the dredging season closed, there appeared to be a fair catch.

The Ridge lies about 1½ miles from the nearest shore, midway between Dona River and Mahon River. It is triangular in shape, with a deep indentation or slough of muddy bottom projecting deeply into its base at the southern end. It has an extent of slightly over 1 mile north and south and its southern end is almost of equal extent east and west. It has a total area of 371 acres and the most productive bottom, that which is rated in this report as bearing dense and

scattering growths, stretches from the northern apex to about the middle of the bed, where it divides into two limbs astride the slough before alluded to.

It is evident that this bed, like Silver bed, is an old one, and without doubt its central portions, those which now bear the heaviest growth of oysters, were formerly elevated above the surrounding bottom to form a shoal or ridge which has been pulled down and in large part carried away by the oystermen, particularly the dredgers, until at present the water over it shoals but little as compared with the surrounding barren areas. The great deposit of shells which originally existed has been taken up and the bottom so denuded that in places the originally underlying mud has been brought to the surface. Many little patches of bare mud were found where there was every reason to expect a deposit of shells and oysters and it was apparent that the bed was being overworked.

The general condition and extent of the bed at the end of June, 1910, is shown in the following table:

OYSTER GROWTH ON RIDGE BED.

Character of oyster growth.	Area.	Oysters per acre.			Estimated content of oysters.
		Under 3 inches.	Over 3 inches.	Total.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Dense	49	160	23	183	8,967
Scattering	86	96	25	121	10,406
Very scattering	65	36	21	57	3,705
Depleted	171	4	1	5	855
Total	371				23,933

The dense areas are two in number, separated by an area of scattered growth. The smaller of these areas lies at the northern apex of the bed and the larger one is a long belt along most of its eastern side. More or less soft mud is to be found in the former, especially near its upper edge, but the latter rests on a solid substratum of shells.

The lower end of the larger dense area gradually verges into a small spot of scattering growth, but most of the bottom bearing a growth of this character is embraced in a long, somewhat S-shaped strip running from near the northern end of the bed almost to its southwest corner. The northern end, especially between and adjacent to the dense growths, is most productive.

The very scattering growth is all confined to the southern edge of the bed, most of it being between the mud slough and the dense and scattering growth. Excepting close to the more productive areas there is much muddy bottom in this area. Most of the depleted

bottom lies on the west side of the bed, but there is a narrow strip along the eastern edge and embracing the southern end of the dense and scattering growth. Much of the depleted area is in reality denuded or barren, and although most of it lies on hard bottom there are numerous muddy spots, especially near the southern edge.

On this bed as a whole and especially on the more productive areas small oysters are in great preponderance. In many cases there were quantities of oysters so small that they fell between the teeth of the tongs.

The following observations were made on this bed:

DETAILS OF EXAMINATIONS OF RIDGE BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
67	June 26	17	Dense	20.0	20.0	3.9	140	39	179
91	June 27	18	do	31.2	21.2	1.6	183	16	199
93	do	16	do	29.1	16.0	1.6	158	16	174
62	June 26	16	Scattering	19.2	7.6	2.0	94	20	114
65	do	16	do	16.0	12.0	4.0	98	40	138
69	do	18	do	17.2	13.6	2.8	108	28	136
92	June 27	16	do	28.8	4.4	2.0	116	20	136
101	do	15	do	7.4	10.7	1.9	63	19	82
61	June 26	14	Very scattering	4.8	1.1	0.7	21	7	28
63	do	15	do	2.2	3.7	5.2	21	52	73
79	June 27	16	do	0.8	10.4	2.4	39	24	63
90	do	17	do	12.4	5.2	0.0	62	0	62
64	June 26	16	Depleted	0.0	0.0	0.0	0	0	0
66	do	16	do	1.2	2.0	0.0	11	0	11
70	do	17	do	2.0	2.4	0.0	15	0	15
80	June 27	15	do	0.0	0.0	0.0	0	0	0
81	do	14	do	2.6	0.7	0.4	12	4	16
82	do	16	do	0.0	0.0	0.0	0	0	0
83	do	17	do	0.4	0.4	0.0	3	0	3
87	do	16	do	0.0	0.0	0.0	0	0	0
88	do	16	do	0.0	0.0	0.0	0	0	0
89	do	16	do	0.0	0.0	0.0	0	0	0
102	do	13	do	0.0	0.0	0.0	0	0	0
103	do	13	do	0.0	0.4	1.1	1	11	12

SMALL BEDS NORTHEAST OF RIDGE BED.

Northeast of the Ridge is a small patch of about 7 acres of very scattering growth which is estimated to contain about 200 bushels of oysters, most of them over 3 inches in length.

The following results were obtained from an examination of this area:

DETAILS OF EXAMINATIONS OF SMALL BEDS NORTHEAST OF RIDGE BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
94	June 27	18	Very scattering	0	1.4	2.4	5	24	29

OLD BED.

Old bed lies close to the southeastern edge of the Ridge, from which it is separated by a narrow strip of mud with many buried shells. It is stated that the dredgers sometimes haul across the barren bottom from one bed to the other.

The condition and extent of the bed as determined by the survey were as follows:

OYSTER GROWTH ON OLD BED.

Character of oyster growth.	Area.	Oysters per acre.			Estimated content of oysters.
		Under 3 inches.	Over 3 inches.	Total.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Very scattering	20	40	2	42	840
Depleted	17	10	3	13	221
Total	37				1,061

Although the bed is at present not very productive it has the appearance of former greater value. It lies on a dense bed of shells and is undoubtedly the remnant of an old accumulation. There are very few large oysters to be found, but the young growth is fair in places and the conditions for a new set are good. The bed evidently has been subjected to severe dredging.

The following observations were made:

DETAILS OF EXAMINATIONS OF OLD BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
76	June 27	16	Very scattering	10.4	2.8	0.0	46	0	46
130	June 30	17	....do	6.0	1.4	0.0	26	0	26
131	...do	19	....do	0.8	5.6	0.8	22	8	30
132	...do	19	....do	10.4	11.6	0.0	77	0	77
133	...do	19	....do	4.8	4.4	0.0	32	0	32
74	June 27	17	Depleted	0.0	2.0	0.0	7	0	7
75	...do	18	....do	1.2	2.0	0.8	11	8	19
78	...do	17	....do	0.0	1.2	0.4	4	4	8
134	June 30	20	....do	0.6	4.4	0.0	18	0	18

OUTSIDE OF OLD BED.

Immediately outside of Old bed is an area of about 16 acres, surrounded by sand, for which the oystermen appear to have no name, if, even, they are aware of its existence. But one observation was made at this place, where a dense growth of young oysters was found. If the other parts of the bed are equally productive this patch contains about 6,800 bushels of oysters, practically all of them under 3 inches in length. The present growth is apparently of recent origin.

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The following results were obtained from the examination:

DETAILS OF EXAMINATIONS OF BEDS OUTSIDE OF OLD BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
77	June 27	15	Dense	35.0	83.4	15.0	414	15	429

SCATTERED PATCHES BETWEEN RIDGE AND SOUTHWEST BEDS.

On the soft bottom lying between these two beds are a number of little patches of oyster growth, of which five were located with the chain and three were examined by tonging. The latter were all highly productive, and they probably represent the possibilities of oyster production in this vicinity on beds not frequented by the dredgers.

The three beds examined covered a total of 11 acres, and it is estimated that they contained about 5,300 bushels of oysters, of which nearly three-fourths were over 3 inches long. Based on the results of the examination, and assuming that the other beds found are equally productive, the five beds probably contain about 11,000 bushels, and it is probable that at least 20,000 bushels are scattered in little 2 to 5 acre patches in the vicinity.

The following table shows the data obtained from examinations:

DETAILS OF EXAMINATIONS OF SMALL SCATTERED PATCHES BETWEEN RIDGE AND SOUTHWEST BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
40	June 22	12	Dense	20.3	21.1	21.1	145	211	356
42	do	14	do	15.2	30.4	20.7	159	207	366
71	June 27	14	do	15.2	14.4	71.5	104	715	819

SOUTHWEST BED.

Southwest bed lies in the southeastern part of the present productive natural oyster grounds of the State and its southern edge is about one-fourth mile north of the "east line" which separates the private beds from the public ones. It has a north and south extent of upward of one-half mile and a maximum width of about one-third mile, containing all told about 106 acres.

The extent and relative productiveness of the bottoms, as classified in this report, are shown in the table following.

OYSTER GROWTH ON SOUTHWEST BED.

Character of oyster growth.	Area.	Oysters per acre.			Estimated content of oysters.
		Under 3 inches.	Over 3 inches.	Total.	
	Acres.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Dense	11	40	744	784	8,624
Scattering	8	99	48	147	1,376
Very scattering	31	18	13	31	961
Depleted	56	4	1	5	280
Total	106				11,241

The area of dense growth is near the southern end of the bed and is flanked on the east and west sides by a very scattering growth, and on the north and south by depleted bottom. Most of the oysters are over 3 inches long and they appear to be in numerous small patches on the soft mud. The place has the appearance of bottom which has been overlooked by the oystermen and may as a whole be somewhat smaller in area than is indicated in the preceding table.

The bottom bearing scattering growth lies at the northeast edge of the bed and at its southwestern limits merges into a strip of very scattering growth running along the western edge of the bed as far as the densely covered bottom first described. There is another small patch of very scattering growth near the southeast corner of the bed.

The depleted bottom lies in three patches, one at each end of the bed and the other at the middle of the eastern edge.

Although it is not known whether Southwest bed was dredged during the past season, it bears every evidence that it has been overworked. Excepting on the small area of dense growth there are few marketable oysters, and bare or almost bare muddy spots are of frequent occurrence. Many oysters had been killed by drills and many of these animals and their egg cases were found.

The following table shows the results of examinations:

DETAILS OF EXAMINATIONS OF SOUTHWEST BED.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
126	June 30	14	Dense	1.5	10.0	74.4	40	744	784
31	June 22	13	Scattering	5.6	22.7	4.8	99	48	147
121	June 30	13	Very scattering	0.4	5.6	0.4	21	4	25
122	...do	12	...do	1.5	7.5	0.4	31	4	35
128	...do	15	...do	0.0	1.4	3.0	5	30	35
129	...do	14	...do	0.0	4.4	1.5	15	15	30
32	June 22	13	Depleted	0.0	0.0	0.0	0	0	0
120	June 30	14	...do	0.4	4.4	0.0	17	0	17
123	...do	12	...do	0.0	1.4	0.4	5	4	9
124	...do	13	...do	0.0	0.0	0.4	0	4	4
125	...do	15	...do	0.0	0.0	0.0	0	0	0
127	...do	15	...do	0.0	0.0	0.0	0	0	0

STONE BED.

This bed possibly takes its name from the quantity of hard, sandy worm tubes, known to the oystermen as "stone coral," which are found attached to and overgrowing the oysters. It is probable that a good many of the latter are stifled and killed by this growth, which is even more abundant on a small depleted patch lying between the Stone bed and the mouth of Mahon River.

The bed covers an area of about 33 acres of very scattering growth, on which there is an average of about 53 bushels of oysters per acre. It is estimated that about July 1, 1910, there were on the entire bed about 1,750 bushels of oysters, the large and small being in about equal quantities.

The following observations were made:

Details of Examination of Stone Bed.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
36......	June 22	13	Very scattering...............	0.7	4.8	2.6	19	26	45
104.....	June 29	18	.....do.........................	......	10.0	2.4	35	24	59

EAST LINE BED.

This bed lies just at the line which marks the southern limits of the public grounds, and it appears that for that reason it has a sentimental interest to the oystermen. It has a diameter not much greater than the length of a boat and is too small to plot on the chart, on which its position is indicated by a circle.

Numerous examinations were made in its vicinity over an area of 6 or 8 acres, but at only one place were oysters found, and there they were very dense and mostly of marketable size.

The data obtained at this station are shown in the following table:

Details of Examinations of East Line Bed.

Station number.	Date of examination.	Depth of water.	Character of growth.	Oysters caught per square yard.			Estimated quantity oysters per acre.		
				Spat.	Culls.	Counts.	Seed.	Market.	Total.
	1910.	*Feet.*		*No.*	*No.*	*No.*	*Bu.*	*Bu.*	*Bu.*
118.....	June 30	13	Dense........................	0.0	10.0	77.8	35	778	813

FLOGGER BED.

Flogger bed lies along Joe Flogger Shoal, which separates Blake Channel from the ship channel. As developed by the survey, it is the largest bed in Delaware, having a length of over 3 miles, an average width of about one-third mile, and an area of about 660 acres. Owing to its exposed situation and the depth of water, as well as to the contradictory information received as to its approximate location and extent, it was the most troublesome bed encountered by the survey. Lines were run across Joe Flogger Shoal from its extreme southern end, but no indications of shells or oysters were encountered until within about one-half mile of east line. From this point scattering shells were found, but when the bottom was examined with the tongs these were discovered to be more or less submerged in the sand.

The bed as outlined on the chart was located almost entirely by means of the chain. At its upper end it lies on the eastern or ship-channel side of Joe Flogger Shoal, but about a mile from its upper end it expands to the westward over an area of somewhat deeper water, and thence, to its southern end, continues on the western or Blake Channel side of the shoal. It was at this point of expansion only that oysters were found, in one small patch of very scattering growth and two or three areas of depleted bottom. The results were not of sufficient importance to exhibit in detail on the chart. It is possible that oysters are to be found in limited quantities in some of the deeper water, but the chain readings did not indicate patches of sufficient importance to warrant the expense of making dredgings. It is reported that there are oysters in some of the deep water of the ship channel, but no indications were found in such places as were examined.

It is understood that Flogger bed has not been dredged for several years, and the survey indicated that while formerly it may have been of importance commensurate with its area, it has become covered with sand throughout practically its whole extent. It may again become productive, but there is no present indication of this probability.

Oysters were reported around the buoy at the head of Flogger Shoal and at another buoy on the opposite side of Blake Channel, but a careful examination, expecially in the latter place, failed to disclose them.

THE BEDS IN SUMMARY.

The oyster bottoms of Delaware all lie between Woodland Beach and the vicinity of Bowers Beach, covering an area about 21 miles long and with an average width of about 3 miles. South and west of a line running east from the old Mahon River Lighthouse and thence approximately southeasterly along Blake Channel, the bottoms are excluded from the common oyster fishery and a considerable proportion of the area is leased to private persons and firms for purposes of oyster culture.

With this area this report will not deal, as it was examined by the writer in but the most cursory manner and the survey of the private beds was being made solely as a State undertaking. It may be stated, however, that the private beds are planted partly with shells, mostly brought from points on Chesapeake Bay, but generally with seed oysters taken from the natural beds. The grounds are in large part leased or controlled by residents of Philadelphia and New Jersey, and the product is consumed principally in Philadelphia, being marketed through Maurice River Cove in New Jersey.

The natural rocks, with which alone this report is concerned, lie in a narrow strip between Blake Channel and the main ship channel on what is known as Joe Flogger Shoal, and between these channels and the Delaware shore in a belt which stretches from the east line above mentioned to about abreast of the upper pier at Woodland Beach, a distance of about 13 miles.

At its southeastern end, where it adjoins the planted area, this zone is about 3 miles in width, but it gradually narrows to the northward until at its upper extremity it is hardly one-half mile wide. The most extensive beds lie in the lower half of the zone and the most intense fishery is carried on in that region. During the time of the survey this was practically the only place in which the dredgers were operating, and we were informed that but little had been done elsewhere earlier in the season.

The following tables summarize the data of the extent, condition, and general distribution of oyster growth on the several beds previously discussed in more detail:

AREAS OF OYSTER BEDS.

Name of bed.	Character of oyster growth.					Total.
	Dense.	Scattering.	Very scattering.	Depleted.	Not determined.	
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Bombay	111	12	6	26		155
Thrum-cap	6	14	55	3		78
Over-the-Bar	109		15	39		163
Between Over-the-Bar and Sand			21			21
Sand	16		11	27		54
Leipsic Rock	4					4
North of Silver		8	17			25
Between Silver and Simons Creek		5	7	5		17
Silver	65	20	45	140		270
Between Silver and Ridge	3		12		21	36
Drum	16	21	19	12		68
Ridge	49	86	65	171		371
Northeast of Ridge			7			7
Old			20	17		37
Outside of Old	16					16
Between Ridge and Southwest	11				12	23
Southwest	11	8	31	56		106
Stone			33			33
East Line	(1)					(1)
Flogger					[2] 660	660
Total	417	174	364	496	693	2,144

[1] Less than 1 acre. [2] Practically all depleted.

ESTIMATED OYSTER CONTENT OF NATURAL BEDS, JULY 1, 1910.

Name of bed.	Character of oyster growth.					Total.
	Dense.	Scattering.	Very scattering.	Depleted.	Not determined.	
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Bombay	40,515	2,512	162			43,189
Thrum-cap	1,164	1,106	1,925			4,195
Over-the-Bar	29,975		615			30,590
Between Over-the-Bar and Sand			1,200			1,200
Sand	3,700		700	200		4,600
Leipsic Rock	3,000					3,000
North of Silver		900	750			1,650
Between Sand and Simons Creek		375	375			750
Silver	15,925	2,180	2,070	1,400		21,575
Between Silver and Ridge	2,500		420		[1] 3,000	5,920
Drum	3,552	1,995	950	84		6,581
Ridge	8,967	10,406	3,705	855		23,933
Patch northeast of Ridge			200			200
Old			840	221		1,061
Outside of Old	6,800					6,800
Between Ridge and Southwest	5,300				[1] 15,000	20,300
Southwest	8,624	1,376	961	280		11,241
Stone			1,750			1,750
East Line	[1] 500					[1] 500
Flogger					(2)	(2)
Total	130,522	20,850	16,623	3,040	18,000	189,035

[1] Estimated from chain indications. [2] Practically all depleted.

Combining the foregoing data, an interesting comparison may be instituted between the beds sustaining a heavy fishery with dredges and those which recently have been worked but little. According to the best information, supported by our own observations in the latter part of the season, practically all of the dredging in 1910 was on the beds south of Over-the-Bar, although a few vessels were observed apparently working on Thrum-cap. These beds, excluding Flogger, had a total area of 1,088 acres and a total estimated oyster content of 111,061 bushels, or an average of 102 bushels per acre, at the end of the season. On the beds which were reported or observed to be most severely worked the oyster content averaged considerably less than this. On the Ridge the average for the whole bed was about 60 bushels per acre, on Drum bed about 97 bushels, on Silver bed about 80 bushels, on Old bed 30 bushels, and on Southwest bed about 106 bushels, and for the five beds taken as a whole the average was about 75 bushels per acre.

The beds above and including Over-the Bar have an area of 396 acres and a total estimated content of 77,984 bushels of oysters of all sizes, or an average of 197 bushels per acre. These beds, owing to their position, are probably more subject than the lower beds to damage from freshets and are probably naturally less productive, yet they had at the time of examination an oyster growth over $2\frac{1}{2}$ times as dense. If we consider the various small patches surrounding the five beds enumerated above, which are in general too small to dredge or which, if large enough, have been overlooked during the season

recently closed, the disparity is still greater. Those which were examined by tonging had an area of 46 acres and an estimated content of 18,000 bushels of oysters, an average of nearly 390 bushels per acre, over five times the density of growth on the large beds in the vicinity.

The number of bushels taken from the beds of Delaware during the past season is not known but it was probably several hundred thousand bushels, and from the conditions found in the survey and the data just deduced it probably can be safely assumed that oysters were from three to five times as abundant at the beginning of the season as they were in its closing days when the survey was made.

This heavy draft on the beds would be less serious were it not accompanied by an abuse for which there is no excuse. In a region devoted mainly to planting and where a comparatively small quantity of oysters is marketed directly from the natural beds it is economically advisable to permit the taking of small oysters as well as large. So long as there is an abundance of shells on the bottom and a reasonable quantity of oysters is left to furnish spawn there will be, under favorable conditions of water and temperature, a more or less regular set of spat and the oyster population of the beds will be fairly maintained, although, of course, the proportion of oysters of marketable size will diminish. When, however, the beds are stripped of shells, as appears to be the case in Delaware, they will surely become depleted.

During the survey, although a number of vessels were actively dredging, no member of the party observed a boat engaged in culling. Inquiry among the oystermen elicited the information that while the boats catching seed oysters for sale generally cull their catch because the planters will not pay oyster prices for shells, the vessels owned or operated by planters when dredging on the public beds rarely do so. They are charged with carrying away everything which the dredge picks up, the shells being valuable for hardening the bottoms on their planting grounds and as cultch for catching a set of spat.

That some vessels are guilty of such behavior is within the knowledge of the writer, and moreover the charge is supported by the condition of the beds. One of the most noteworthy of the facts disclosed by the tong examinations was the small quantity of shells found as compared with similar examinations of beds in other States. On the five important beds in the vicinity of the Ridge there are less than 2 per cent as many shells per square yard as are found on the seed beds of James River, Va., where culling is strictly enforced. In places the deep pavement of shells which must have existed formerly has been completely removed and the underlying mud now shows itself in patches in the midst of the beds. A hard-worked bed to be in a healthy condition should contain an abundance of shells. The ultimate result of the continuance of this state of affairs is not difficult

to foresee. Oysters can not set on the mud. They must have some hard, clean object to which to attach when they settle down from their infantile free-swimming habit, and on the beds the old shells and the oysters themselves offer the only possibilities. If there be few or no shells the recuperation of exhausted beds is correspondingly retarded. If both shells and oysters are persistently removed, the most productive bed eventually will be hopelessly depleted.

PHYSICAL AND BIOLOGICAL CONDITIONS.

TIDES AND CURRENTS.

A staff tide gauge was established at the wharf at Mahon River Light-house and readings were taken hourly from 8 a. m. until 5 p. m. during the period of the survey. This does not furnish a very accurate plane of reference, but as the location of the gauge was central with respect to the more important beds it is sufficiently accurate for the purposes of this report. The average rise and fall of the tide between June 19 and July 10 was 5.4 feet, the minimum being 4.5 feet on July 10 and the maximum 6.3 on July 2.

No measurements of the velocity of currents were made, but in general it may be stated that they are strong throughout the region embraced in this report.

SALINITY OF THE WATER.

The salinity of the water exhibited a very considerable range within the limits covered by the survey. From June 18 to July 10 observations were made three times daily at the anchorage of the *Fish Hawk* and several times each day on the oyster beds undergoing examination. Most of the observations on the *Fish Hawk* were made at a point about 1 mile south of the east line and about 3 miles offshore, but others, fewer in number, were made near the southern limit of the planted beds, near the middle of the north and south extent of the public beds, and at the upper limit of oyster growth opposite Woodland Beach.

The data obtained are shown in the following table:

SALINITY OF WATER OVER OYSTER BEDS, JUNE 18 TO JULY 10.

Locality.	Number of observations.	Specific gravity of water corrected.			Average temperature of water.
		Maximum.	Minimum.	Average.	
					°F.
Opposite Woodland Beach	3	1.0074	1.0032	1.0057	79
Midway between Ship John and Elbow Light-house	3	1.0121	1.0100	1.0107	77
3¼ miles southeast by east of Mahon River Light	33	1.0149	1.0103	1.0136	77
6 miles east-northeast of Bowers Beach	6	1.0178	1.0158	1.0164	68

At the upper limit of oyster growth the salinity of the water was low at a time when there had been comparatively little rainfall, and it is probable that it may become practically fresh at this point during periods of freshet. This is without much doubt the cause inhibiting the growth of oysters at places higher up the river.

At the southern end of the planting grounds the salinity is comparatively high and in consequence it is to be expected that the drill or borer would be destructive. On the more important of the public beds, those lying between the east line and the mouth of Leipsic Creek, the density is favorable for the welfare of the oysters. It probably never falls so low as seriously to threaten the beds, and, on the other hand, it is hardly high enough, excepting close to the east line, to favor an abundance of drills.

ENEMIES OF THE OYSTER.

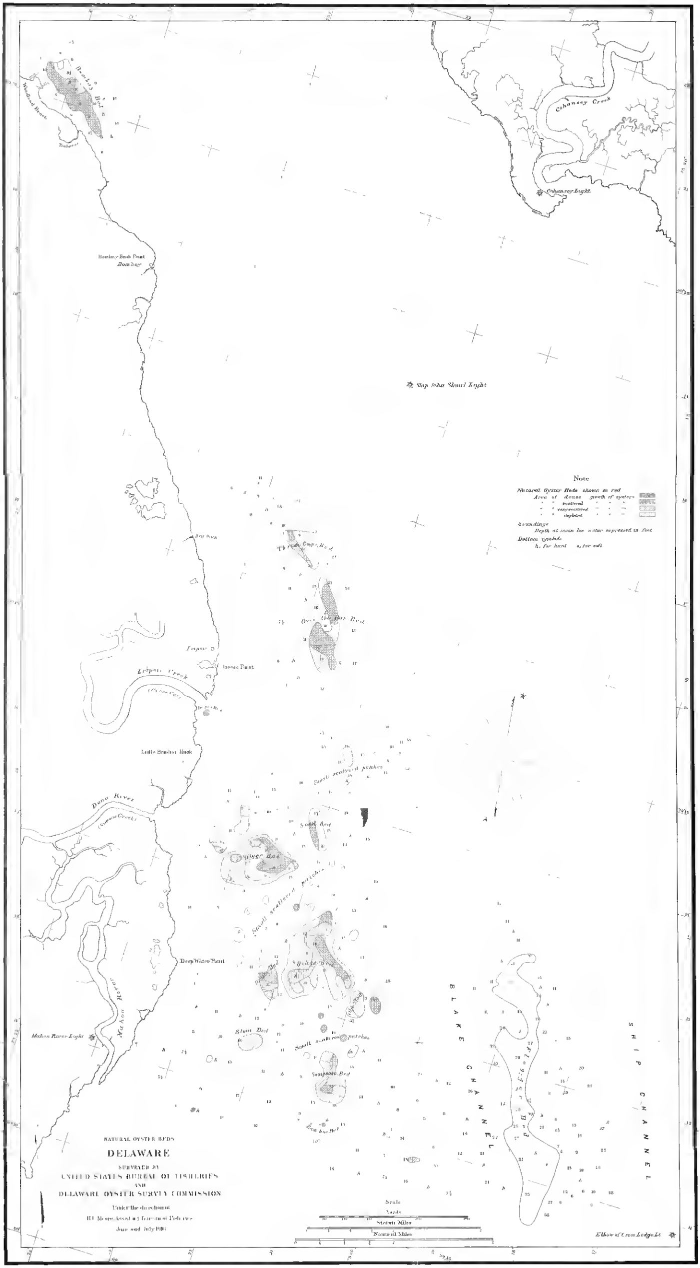
It is stated that schools of drumfish occasionally appear on the oyster beds of Delaware Bay and cause much damage, but none were observed during the survey. This enemy of the oyster is usually more destructive on planted beds than on the public rocks, probably because the single-culled oysters on the former are easier to crush than are the clustered, sharp-edged specimens more common on the natural beds. The inroads of the drumfish are sporadic and unexpected in most places, although on the coasts of some of the Southern States they are frequent enough to warrant the inclosure of the planted beds with wire fences. This appears to be the only really adequate protection, though if the presence of a school on the beds or in their vicinity is discovered in time it can often be driven from the neighborhood by the use of explosives.

The principal enemy to the oyster on the Delaware beds is the drill or borer, a small marine snail which drills a hole through the oyster's shell and thus gains access to the contents, which it consumes. The perforation is made by actual drilling with a rasplike organ protruded from the mouth, and so far as is known no acid or other solvent is employed to soften the shell. The drill breeds during late spring and summer, laying its eggs in vase-shaped, leathery capsules attached in clusters to shells and other hard bodies on the bottom. These capsules, each containing several eggs, are readily recognizable, being about one-fourth inch long and usually yellow in color.

In the few places examined on the planted beds there were considerable numbers of drills and many small oysters killed by them. On the public beds near the east line some drills and killed oysters were found, but over most of the area surveyed the salinity of the water is somewhat too low to permit these pests ever to become a serious factor. Below a salinity represented approximately by a mixture of equal parts of salt and fresh water, having a specific gravity of about 1.012 or 1.013, the drill will not thrive.

Although in the absence of other food the drill will attach and sometimes kill oysters of marketable size, it invariably attacks smaller ones by preference. Seed oysters 2 or $2\frac{1}{2}$ inches in diameter are comparatively immune, and in places where the drills are particularly troublesome such seed should be planted in preference to smaller. Although such is not known to be the case in Delaware, there are localities in which it is useless to plant shells or other cultch, as the spat is drilled before its shell has lost its first paperlike thinness.

The drill is a difficult enemy to combat. Where it is sufficiently abundant to be a menace on private beds the oysters are usually dredged up and the drills removed by hand and destroyed, after which the oysters are again laid down. Much can be done by destroying the drills and their egg capsules wherever found. The common practice of some Delaware planters of depositing rough seed on their beds undoubtedly helps to maintain the abundance of the drill.



Cohansey Creek
Cohansey Light
Woodland Beach
Bombay Hook Point
Bombay
Ship John Shoal Light
Note
Natural Oyster Beds shown in red
Area of dense growth of oysters
scattered
very scattered
depleted
Soundings
Depth at mean low water expressed in feet
Bottom symbols
h. for hard s. for soft
Thrum Cap Bed
Over the Bar Bed
Leipsic
Leipsic Creek
Little Bombay Hook
Dona River
Small scattered patches
Sand Bed
Deep Water Point
Mahon River
Mahon River Light
Slum Bed
Small scattered patches
Southwest Bed
BLAKE CHANNEL
SHIP CHANNEL
NATURAL OYSTER BEDS
DELAWARE
SURVEYED BY
Scale
Yards
Statute Miles
Nautical Miles
Elbow of Cross Ledge Lt.

THE FISHERIES OF ALASKA IN 1910

By Millard C. Marsh
Agent at the Salmon Fisheries of Alaska

and

John N. Cobb
Assistant Agent

Bureau of Fisheries Document No. 746

CONTENTS.

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By MILLARD C. MARSH, *Agent at the Salmon Fisheries of Alaska,*
and
JOHN N. COBB, *Assistant Agent.*

SUMMARIZED STATISTICS OF THE FISHERIES.

As in the similar reports for previous years, the District of Alaska is considered in the four geographic sections generally recognized, as follows: Southeast Alaska, embracing all that narrow strip of mainland and the numerous islands adjacent, from Portland Canal northwestward to and including Yakutat Bay; central Alaska, the region on the Pacific, or south side, from Yakutat Bay westward, including the Aleutian chain; western Alaska, the shores of Bering Sea and islands in this sea; and arctic Alaska, from Bering Strait to the Canadian border.

With the exception of arctic Alaska and a portion of central and western Alaska, practically all of the fishing localities were visited by one or the other of the two agents engaged in the inspection work this year. Considerable commercial fishing is carried on in the Yukon River and its tributaries, where fish wheels, nets, and spears are employed, but unfortunately it has been found impossible so far, owing to the short time available for the agents each season, to extend the inspection work over this large area, or to secure data showing the extent of the fisheries there. Owing to the impossibility of the agents visiting arctic Alaska in the limited open season, the data for this section are incomplete, but what have been secured are shown.

It has been found an impossibility to secure even approximate data as to the persons engaged or the investment in the hunting of aquatic animals (except fur seals and sea otters), which is general among the natives.

PERSONS ENGAGED.

The number of persons engaged in the fisheries of Alaska in 1910 was 15,620, an increase of 3,032 over 1909. Of these 6,836 were whites, 4,147 Indians, 2,411 Chinese, 2,206 Japanese, 4 Koreans, and

16 Filipinos, as compared with 5,608 whites, 2,823 Indians, 1,998 Chinese, and 2,159 Japanese, in 1909, showing an increase in 1910 of 1,228 whites, 1,324 Indians, 413 Chinese, and 47 Japanese. The most gratifying feature is the large increase in the number of whites and Indians employed, as all of the Indians and many of the whites are permanent residents of the District. The fact that the fishermen act as sailors on the transporting vessels to and from the salmon canneries and salteries explains the small number of transporters shown in the table as compared with the large number of transporting vessels.

PERSONS ENGAGED IN THE ALASKA FISHERIES IN 1910.

Occupation and race.	Southeast Alaska.	Central Alaska.	Western Alaska.	Arctic Alaska.	Total.
Fishermen:					
Vessel—					
Whites	402	6			408
Indians	38	48			86
Japanese	4				4
Total	444	54			498
Shore—					
Whites	1,149	737	1,589		3,475
Indians	1,710	196	72	438	2,416
Chinese	10		9		19
Japanese	3				3
Total	2,872	933	1,670	438	5,913
Total fishermen	3,316	987	1,670	438	6,411
Shoresmen:					
Whites	731	396	1,232	10	2,369
Indians	1,103	132	331		1,566
Chinese	705	468	1,218		2,391
Japanese	472	393	1,323		2,188
Koreans		4			4
Filipinos			16		16
Total	3,011	1,393	4,120	10	8,534
Transporters:					
Whites	264	115	205		584
Indians	69	10			79
Chinese		1			1
Japanese	8	3			11
Total	341	129	205		675
Grand total	6,668	2,509	5,995	448	15,620

INVESTMENT.

The total investment in the fisheries is $20,711,422, an increase of $10,829,740, as compared with 1909. A considerable proportion of this increase is due to the showing of cash capital once more, this item having been eliminated for the first time in 1906. Nearly all forms of apparatus show increases as compared with 1909.

INVESTMENT IN THE ALASKA FISHERIES IN 1910.

Items.	Southeast Alaska.		Central Alaska.		Western Alaska.		Arctic Alaska.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Fishing vessels:										
Steamers and launches	71	$501,100							71	$501,100
Tonnage	1,024								1,024	
Outfit		177,049								177,049
Sailing	3	3,800	2	$4,000					5	7,800
Tonnage	35		87						122	
Outfit		875		1,300						2,175
Transporting vessels:										
Steamers and launches	135	366,850	28	252,050	44	$650,950			207	1,269,850
Tonnage	1,378		1,195		2,662				5,235	
Outfit		210,800		77,900		109,600				398,300
Sailing	20	180,150	13	385,500	32	711,000			65	1,276,650
Tonnage	6,753		17,395		41,748				65,896	
Outfit		33,200		22,000		48,000				103,200
Steamers and launches (under 5 tons)	240	401,030	12	26,225	7	18,200			259	[a] 445,455
Boats, sail and row	1,090	59,648	570	33,880	845	186,840	82	$13,300	2,587	293,668
Scows and lighters	142	67,183	111	58,300	130	107,529			383	233,012
Pile drivers	22	45,197	21	46,300	17	38,300			60	129,797
Apparatus, vessel fisheries:										
Purse seines	10	3,995							[b] 10	3,995
Lines, trawl		22,080								22,080
Shotguns			48	476					48	476
Whaling gear		1,015								1,015
Apparatus, shore fisheries:										
Haul seines	48	9,797	56	21,285					[c] 104	31,082
Purse seines	152	43,079							[d] 152	43,079
Gill nets	416	58,659	132	17,295	903	90,682			[e] 1,451	166,636
Dip nets	13	123	18	9					31	132
Lines, hand		521		1,245						1,766
Lines, trawl		15,870								15,870
Traps, stake	41	109,550	38	51,162	14	19,500			93	180,212
Traps, floating	13	22,728	1	1,500					14	24,228
Crab pots	366	1,082							366	1,082
Spears	120	115							120	115
Hoes	14	10	5	4					19	14
Shotguns	40	1,200							40	1,200
Whaling gear								18,450		18,450
Cash capital		3,544,333		1,593,444		3,456,660		10,000		8,604,437
Shore and accessory property		2,376,584		1,346,405		3,030,008		4,500		6,757,497
Total		8,257,623		3,940,280		8,485,706		46,250		20,711,422

[a] Includes outfit.
[b] Aggregate length of 3,280 yards.
[d] Aggregate length of 36,190 yards.
[d] Aggregate length of 59,030 yards.
[e] Aggregate length of 412,176 yards.

PRODUCTS.

The total quantity of products was 214,536,433 pounds, valued at $13,259,859, an increase of 12,553,195 pounds and $2,078,471 over 1909. Except for salmon bellies and backs, fertilizer, oil, furs, and hides, the weights are round weights, or the weights of products when first taken from the water; for weights of prepared products the reader is referred to the subsidiary tables of the report. As the packing establishments almost invariably catch their own fish, it has been found practically impossible to show the value of the products as they leave the fishermen's hands, hence the values shown are for the prepared products.

PRODUCTS OF ALASKA FISHERIES IN 1910.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Black cod:						
Fresh	13,800	$572				
Frozen	10,172	326				
Pickled	72,673	1,934				
Cod:						
Fresh	6,000	300	16,000	$560		
Pickled			125,866	3,320		
Dry-salted			2,877,157	59,433		
Tongues, pickled			3,600	130		
Eulachon:						
Fresh	2,600	104				
Pickled	40,000	1,200				
Smoked	600	36				
Flounders, or sole	5,000	150				
Halibut:						
Fresh	19,038,001	731,914	51,000	2,040		
Frozen	2,467,125	73,548				
Fletched	73,893	2,534				
Pickled	270	14				
Herring:						
Fresh	574,359	5,203	10,000	300		
Frozen	522,500	5,225				
Pickled	731,560	12,255	60,480	1,728		
Dry-salted	45,600	954				
Eggs, dried	1,000	100				
Pollock			1,800	90		
Redfish, or black bass	19,100	960	8,000	400		
Rock cod:						
Fresh	22,000	1,080	11,000	440		
Pickled	160	7				
Salmon:						
Fresh—						
Coho, or silver	52,588	2,419	7,500	225		
Humpback, or pink	24,000	300				
King, or spring	977,348	45,770				
Red, or sockeye	77,577	4,378	28,000	840		
Frozen—						
Coho, or silver	97,529	3,889				
Dog, or chum	17,337	695				
King, or spring	38,576	1,235				
Canned—						
Coho, or silver	5,841,990	404,907	1,394,960	99,103	814,870	$55,656
Dog, or chum	16,221,450	703,555	9,170	403	1,564,640	69,451
Humpback, or pink	34,382,285	1,565,358	2,225,790	101,380	2,194,360	97,317
King, or spring	24,360	1,998	1,105,020	85,235	1,686,090	127,569
Red, or sockeye	18,247,740	1,466,918	25,541,250	1,959,539	57,729,700	4,347,933
Mild-cured—						
King, or spring	3,824,900	218,441	35,650	2,232		
Pickled—						
Coho, or silver	9,450	296	33,750	1,208		
Humpback, or pink	84,780	1,905	3,510	78	810	15
King, or spring					95,040	3,399
King, or spring, fins	400	24				
Red, or sockeye	540	20	400,950	12,278	2,819,880	92,351
Red, or sockeye, tips					800	60
Dry-salted—						
Coho, or silver, backs			10,000	290		
Dog, or chum	29,570	554				
King, or spring	9,600	288				
Humpback, or pink, backs	21,800	278	1,500	25		
Red, or sockeye, backs			17,000	410		
Smoked—						
Coho, or silver, backs			2,000	200		
Dog, or chum	440	60				
Humpback, or pink, backs	100	5				
Red, or sockeye, backs			16,058	1,608		
Salmon bellies, pickled:						
Coho, or silver			25,200	1,135		
Dog, or chum	14,000	770				
Humpback, or pink	84,200	4,410	39,000	1,725		
King, or spirng	1,200	128				
Red, or sockeye	600	24	161,000	10,815		
Smelt	4,085	205				
Tomcod	800	32				

PRODUCTS OF ALASKA FISHERIES IN 1910—Continued.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Trout:						
Cutthroat	1,000	$50				
Dolly Varden, or salmon trout—						
Fresh	50,000	2,000	15,000	$750		
Canned			13,510	618		
Pickled	1,000	50				
Rainbow	7,100	284				
Steelhead—						
Fresh	3,800	168				
Frozen	19,215	1,153				
Fertilizer:						
Herring	2,617,000	40,000				
Whale	869,141	16,456				
Oil:						
Herring	2,077,500	55,000				
Shark	165	10				
Whale	2,744,480	117,270				
Abalone shells	70	30				
Clams	6,880	430	3,200	120		
Crabs	116,904	4,902	32,000	2,400		
Seaweed	2,000	300				
Aquatic furs and skins:						
Beaver	368	1,922	608	2,763	1,026	$5,883
Castoreum			11	59	52	160
Muskrat	1,592	5,086	560	917	25,834	69,245
Otter—						
Land	1,232	5,213	1,117	4,493	2,302	8,843
Sea	15	600	120	5,900	20	670
Sea, pups			3	5	6	32
Seal—						
Fur	828	4,207			85,476	468,042
Fur, unborn					242	12
Hair	2,790	796			871	150
Walrus ivory	80	85				
Whale products:						
Bones, unground	400,000	4,500				
Bones, ground	395,000	4,789				
Stearin	114,711	5,249				
Whalebone, or baleen	55,025	4,805				
Total	113,223,554	5,542,633	34,288,340	2,365,195	67,022,019	5,346,788

Products.	Arctic Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.
Black cod:				
Fresh			13,800	$572
Frozen			10,172	326
Pickled			72,673	1,934
Cod:				
Fresh			22,000	860
Pickled			125,866	3,320
Dry-salted			2,877,157	59,433
Tongues, pickled			3,600	130
Eulachon:				
Fresh			2,600	104
Pickled			40,000	1,200
Smoked			600	36
Flounders, or sole			5,000	150
Halibut:				
Fresh			19,089,001	733,954
Frozen			2,467,125	73,548
Fletched			73,893	2,534
Pickled			270	14
Herring:				
Fresh			584,359	5,503
Frozen			522,500	5,225
Pickled			792,040	13,983
Dry-salted			45,600	954
Eggs, dried			1,000	100
Pollock			1,800	90
Redfish, or black bass			27,100	1,360

PRODUCTS OF ALASKA FISHERIES IN 1910—Continued.

Products.	Arctic Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.
Rock cod:				
Fresh			33,000	$1,520
Pickled			160	7
Salmon:				
Fresh—				
Coho, or silver			60,088	2,644
Humpback, or pink			24,000	300
King, or spring			977,348	45,770
Red, or sockeye			105,577	5,218
Frozen—				
Coho, or silver			97,529	3,889
Dog, or chum			17,337	695
King, or spring			38,576	1,235
Canned—				
Coho, or silver			8,051,820	559,666
Dog, or chum			17,795,260	773,409
Humpback, or pink			38,802,435	1,764,055
King, or spring			2,815,470	214,802
Red, or sockeye			101,518,690	7,774,390
Mild-cured—				
King, or spring			3,860,550	220,673
Pickled—				
Coho, or silver			43,200	1,504
Humpback, or pink			89,100	1,998
King, or spring			95,040	3,399
King, or spring, fins			400	24
Red, or sockeye			3,221,370	104,649
Red, or sockeye, tips			800	60
Dry-salted—				
Coho, or silver, backs			10,000	290
Dog, or chum			29,570	554
King, or spring			9,600	288
Humpback, or pink, backs			23,300	303
Red, or sockeye, backs			17,000	410
Smoked—				
Coho, or silver, backs			2,000	200
Dog, or chum			440	60
Humpback, or pink, backs			100	5
Red, or sockeye, backs			16,058	1,608
Salmon bellies, pickled:				
Coho, or silver			25,200	1,135
Dog, or chum			14,000	770
Humpback, or pink			123,200	6,135
King, or spring			1,200	128
Red, or sockeye			161,600	10,839
Smelt			4,085	205
Tomcod			800	32
Trout:				
Cutthroat			1,000	50
Dolly Varden, or salmon trout—				
Fresh			65,000	2,750
Canned			13,510	618
Pickled			1,000	50
Rainbow			7,100	284
Steelhead—				
Fresh			3,800	168
Frozen			19,215	1,153
Fertilizer:				
Herring			2,617,000	40,000
Whale			869,141	16,456
Oil:				
Herring			a 2,077,500	55,000
Shark			b 165	10
Whale			c 2,744,480	117,270
Abalone shells			70	30
Clams			d 10,080	550
Crabs			e 148,904	7,302
Seaweed			2,000	300
Aquatic furs and skins:				
Beaver			f 2,002	10,568
Castoreum			63	219
Muskrat			g 27,986	75,248

a Represents 277,000 gallons.
b Represents 22 gallons.
c Represents 369,930 gallons.
d Represents 1,260 bushels.
e Represents 70,452 crabs.
f Represents 2,002 skins.
g Represesnt 223,893 skins.

PRODUCTS OF ALASKA FISHERIES IN 1910—Continued.

Products.	Arctic Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.
Aquatic furs and skins—Continued.				
Otter—				
Land			a 4,651	$18,549
Sea			b 155	7,170
Sea, pups			c 9	37
Seal—				
Fur			d 86,304	472,249
Fur, unborn			e 242	12
Hair			f 3,661	946
Walrus ivory	186	$186	266	271
Whale products:				
Bones, unground			400,000	4,500
Bones, ground			395,000	4,789
Stearin			114,711	5,249
Whalebone, or baleen	2,334	5,057	57,359	9,862
Total	2,520	5,243	214,536,433	13,259,859

a Represents 1,861 skins.
b Represents 31 skins.
c Represents 3 skins.
d Represents 14,384 skins (of these, 660 skins were from a seized Japanese schooner).
e Represents 121 skins (these were from a seized Japanese schooner).
f Represents 1,221 skins.

THE SALMON INDUSTRY.

The run of salmon was very good in all sections except western Alaska. For a time the outlook was bad in southeast Alaska owing to the excessive rains which prevailed during the first half of the season, causing the salmon to rush up the streams, but an exceptionally dry spell lasting six weeks followed, which made the streams quite low and kept the fish from going up too rapidly. As a result the fisherman were enabled to make large catches during this period.

HATCHERIES.

Seven salmon hatcheries were operated during the season of 1909–10, as follows:

SALMON HATCHERIES OPERATED IN 1910.

Name.	Location.	Owner and operator.
Yes Lake	Yes Lake	United States Bureau of Fisheries.
Afognak	Afognak Island	Do.
Fortmann	Naha Stream	Alaska Packers Association.
Karluk	Karluk River	Do.
Klawak	Klawak Lake	North Pacific Trading and Packing Co., and North Alaska Salmon Co.
Hetta	Hetta Lake	Northwestern Fisheries Co.
Quadra	Quadra Lake	Do.

The Alaska Packers Association reports as follows on a subject of interest to fish culturists:

We have been quite successful in retaining the fry in our nursery ponds [at Fortmann hatchery] for a definite period and feeding them on fresh steelheads macerated

to a pulp. In two ponds containing about 10,000,000 fry, from 30 to 40 pounds of this food was fed each day, and they appeared to thrive wonderfully well upon it, as scarcely any dead fry were found.

The rainfall was 160.80 inches and the snowfall 289 inches for the year ended June 30, 1910, at Fortmann hatchery; which record will give a slight idea of the weather conditions with which the superintendents of hatcheries in Alaska have to contend. Despite the adverse weather conditions, however, all of the hatcheries except Fortmann and Afognak operated at full capacity, and taken as a whole the season was a fairly successful one.

The Klawak Lake hatchery of the North Pacific Trading & Packing Co. was enlarged the present summer so that it is now able to handle 10,000,000 eggs.

At the dam on the stream leading to Capt. John C. Callbreath's hatchery on McHenry Inlet a man has been stationed each year since the hatchery was shut down, for the purpose of lifting the salmon over the structure. In 1908, 1,022 males and 876 females were put over, and in 1909, 516 males and 434 females.

OUTPUT OF THE SALMON HATCHERIES OF ALASKA.

Hatcheries.	Year ended June 30, 1910. [a]				Eggs taken 1910-11.	
	Red, or sockeye.		Humpback, or pink.		Red, or sockeye.	Humpback, or pink.
	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.		
Yes Lake	[b] 72,005,000	69,879,600			72,000,000	114,000
Afognak	76,020,000	68,422,170	499,400	363,740	30,725,000	405,000
Fortmann	53,340,000	50,725,000			34,920,000	
Karluk	45,228,000	40,620,000			49,626,000	
Klawak	(c)	5,300,000			(c)	
Hetta	10,313,000	9,000,000			9,141,000	
Quadra	10,863,000	9,850,000			11,200,000	
Total		253,796,770	499,400	363,740	9,141,000	519,000

[a] In three instances fry were held until July, 1910, and in order to make the record for the season complete these have been included.
[b] Of these, 5,000 were reported as coho eggs.
[c] No report.

STATISTICS.

CATCH IN 1907, 1908, 1909, AND 1910.

Following is a table showing, for the geographic sections, by apparatus and species and by species alone, the number of salmon caught in the years 1907, 1908, 1909, and 1910. All species, except red salmon, show increases over 1909. The total catch in 1910 is smaller than in any of the other years shown.

CATCH OF SALMON IN ALASKA IN 1907, 1908, 1909, AND 1910, BY SECTIONS, SPECIES, AND APPARATUS.

Apparatus and species.	1907	1908	1909	1910
SOUTHEAST ALASKA.				
Seines:				
Coho, or silver	302,963	273,993	165,177	322,521
Dog, or chum	1,101,822	1,378,339	387,774	1,566,221
Humpback, or pink	8,614,551	8,900,467	5,572,005	6,228,732
King, or spring	259	1,812	293	152
Red, or sockeye	1,419,221	1,691,149	1,285,265	1,481,898
Total	11,438,816	12,245,760	7,410,514	9,599,522
Traps:				
Coho, or silver	139,783	119,034	112,213	165,023
Dog, or chum	158,170	368,709	337,395	437,726
Humpback, or pink	3,438,335	5,102,843	3,628,940	3,151,684
King, or spring	26,835	3,448	5,107	2,546
Red, or sockeye	615,684	486,646	893,816	860,737
Total	4,378,807	6,080,680	4,977,471	4,617,716
Gill nets:				
Coho, or silver	83,943	84,176	78,845	164,990
Dog, or chum	74,298	56,431	9,041	28,802
Humpback, or pink	18,029	59,582	127,422	32,357
King, or spring	70,388	64,148	68,659	51,667
Red, or sockeye	214,442	378,834	478,398	574,251
Total	461,100	643,171	762,365	852,067
Lines:				
Coho, or silver	1,052	1,329	8,000	6,000
King, or spring	23,082	61,633	134,606	204,823
Total	24,134	62,962	142,606	210,823
Spears:				
Red, or sockeye	20,000	4,000	45,400	70,000
Wheels:				
King, or spring	....	27	....	....
Total:				
Coho, or silver	527,741	478,532	364,235	658,534
Dog, or chum	1,334,290	1,803,479	734,210	2,032,749
Humpback or pink	12,070,915	14,062,892	9,328,367	9,412,773
King, or spring	120,564	131,068	208,665	259,188
Red, or sockeye	2,269,347	2,560,629	2,702,879	2,986,886
Grand total	16,322,857	19,036,600	13,338,356	15,350,130
CENTRAL ALASKA.				
Seines:				
Coho, or silver	48,759	60,847	52,258	64,202
Humpback, or pink	252,373	268,466	127,549	375,041
King, or spring	4,015	3,028	3,907	1,598
Red, or sockeye	3,568,069	2,709,750	2,038,833	2,227,803
Total	3,873,216	3,042,091	2,222,547	2,668,644
Traps:				
Coho, or silver	163,076	90,616	89,918	115,922
Dog, or chum	....	....	....	1,318
Humpback, or pink	6,420	375,140	3,740	273,023
King, or spring	36,791	17,216	44,632	34,007
Red, or sockeye	2,711,142	2,285,401	2,152,555	2,095,563
Total	2,917,429	2,768,373	2,290,845	2,519,833
Gill nets:				
Coho, or silver	15,000	....	....	18,826
King, or spring	27,022	18,351	18,059	15,995
Red, or sockeye	358,649	512,464	487,984	298,915
Total	400,671	530,815	506,043	333,736
Total:				
Coho, or silver	226,835	151,463	142,176	198,950
Dog, or chum	....	....	....	1,318
Humpback, or pink	258,793	643,606	131,289	648,064
King, or spring	67,828	38,595	66,598	51,600
Red, or sockeye	6,637,860	5,507,615	4,679,372	4,622,281
Grand total	7,191,316	6,341,279	5,019,435	5,522,213

CATCH OF SALMON IN ALASKA IN 1907, 1908, 1909, AND 1910, BY SECTIONS, SPECIES, AND APPARATUS—Continued.

Apparatus and species.	1907	1908	1909	1910
WESTERN ALASKA.				
Traps:				
Coho, or silver	29,199	20,000	9,930	6,340
Dog, or chum	36,141	114,534	101,456	58,039
Humpback, or pink	1,500	261,519	15	513,072
King, or spring	5,011	4,856	3,096	4,382
Red, or sockeye	1,078,869	860,516	508,011	326,833
Total	1,150,720	1,261,425	622,508	908,666
Gill nets:				
Coho, or silver	109,650	86,088	71,393	132,860
Dog, or chum	472,586	340,309	346,340	252,179
Humpback, or pink	337,514	138,138	31,811	149,057
King, or spring	134,391	87,174	128,893	97,373
Red, or sockeye	9,181,034	16,013,966	15,133,872	11,266,776
Total	10,235,175	16,665,675	15,712,309	11,898,245
Total:				
Coho, or silver	138,849	106,088	81,323	139,200
Dog, or chum	508,727	454,843	447,796	310,218
Humpback, or pink	339,014	399,657	31,826	662,129
King, or spring	139,402	92,030	131,989	101,755
Red, or sockeye	10,259,903	16,874,482	15,641,883	11,593,609
Grand total	11,385,895	17,927,100	16,334,817	12,806,911
TOTAL.				
Seines:				
Coho, or silver	351,722	334,840	217,435	386,723
Dog, or chum	1,101,822	1,378,339	387,774	1,566,221
Humpback, or pink	8,866,924	9,168,933	5,699,554	6,603,773
King, or spring	4,274	4,840	4,200	1,750
Red, or sockeye	4,987,290	4,400,899	3,324,098	3,709,701
Total	15,312,032	15,287,851	9,633,061	12,268,168
Traps:				
Coho, or silver	332,058	229,650	212,061	287,285
Dog, or chum	194,311	483,243	438,851	497,083
Humpback, or pink	3,446,255	5,739,502	3,632,695	3,937,779
King, or spring	68,637	25,520	52,835	40,935
Red, or sockeye	4,405,695	3,632,563	3,584,382	3,283,133
Total	8,446,956	10,110,478	7,920,824	8,046,215
Gill nets:				
Coho, or silver	208,593	170,264	150,238	316,676
Dog, or chum	546,884	396,740	355,381	280,981
Humpback, or pink	355,543	197,720	159,233	181,414
King, or spring	231,801	169,673	215,611	165,035
Red, or sockeye	9,754,125	16,905,264	16,070,254	12,139,942
Total	11,096,946	17,839,661	16,950,717	13,084,048
Lines:				
Coho, or silver	1,052	1,329	8,000	6,000
King, or spring	23,082	61,633	134,606	204,823
Total	24,134	62,962	142,606	210,823
Spears:				
Red, or sockeye	20,000	4,000	45,400	70,000
Wheels:				
King, or spring	....	27	....	....
Total:				
Coho, or silver	893,425	736,083	587,734	996,684
Dog, or chum	1,843,017	2,258,322	1,182,006	2,344,285
Humpback, or pink	12,668,722	15,106,155	9,491,482	10,722,966
King, or spring	327,794	261,693	407,252	412,543
Red, or sockeye	19,167,110	24,942,726	23,024,134	19,202,776
Grand total	34,900,068	43,304,979	34,692,608	33,679,254

NUMBER AND GROSS WEIGHT OF EACH SPECIES OF SALMON CAUGHT IN 1907, 1908, 1909, AND 1910.

Species.	1907		1908	
	Number.	*Pounds.*	*Number.*	*Pounds.*
Coho, or silver	893,425	5,360,550	736,083	4,416,498
Dog, or chum	1,843,017	14,744,136	2,258,322	18,066,576
Humpback, or pink	12,668,722	50,674,888	15,106,155	60,424,620
King, or spring	327,794	7,211,468	261,693	5,757,246
Red, or sockeye	19,167,110	95,835,550	24,942,726	124,713,630
Total	34,900,068	173,826,592	43,304,979	213,378,570

Species.	1909		1910	
	Number.	*Pounds.*	*Number.*	*Pounds.*
Coho, or silver	587,734	3,526,404	996,684	5,980,104
Dog, or chum	1,182,006	9,456,048	2,344,285	18,754,280
Humpback, or pink	9,491,482	37,965,928	10,722,966	42,891,864
King, or spring	407,252	8,959,544	412,543	9,075,946
Red, or sockeye	23,024,134	115,120,670	19,202,776	96,013,880
Total	34,692,608	175,028,594	33,679,254	172,716,074

CANNING.

When the season of 1909 opened, all grades of salmon, except pinks and chums, were commanding remunerative prices. The prices of these two grades began to crumble in 1908 and kept on dropping through 1909, until finally they reached bottom at $2.40 per case for pinks (a drop of $1.05 per case from the 1907 prices) and $2.28 per case for chums (a drop of 96 cents per case from the 1907 prices). The demand for pink and chum salmon began to fall off in 1907, despite which the packers kept on piling up stock during the next two years, with the result that they became a drug on the market, and for a time it was difficult to move them, even at the above unremunerative prices. Late in 1909 the demand began to improve, and when the season of 1910 opened but few pinks and chums were left in first hands.

Early in the season rumors began to circulate that prices on all grades would be advanced, and the buyers, who had been content to buy only for immediate necessities as long as prices seemed to be crumbling, now came into the market with orders for large stocks. As a result, the packers soon were obliged to prorate the orders, as the pack did not begin to equal the demand. The expected high prices were realized, and before the pack had come out of Alaska it was all sold at the most remunerative figures realized by the packers in years.

In 1909, owing to the expected quadrennial heavy run of sockeye salmon on Puget Sound, the canneries of Gorman & Co., at Kasaan, of the Astoria & Puget Sound Packing Co., in Excursion Inlet, and of the Fidalgo Island Packing Co., at Ketchikan, all in southeast

Alaska, were shut down, as these companies felt it would be more profitable to devote all their energies to their Puget Sound plants. In 1910 all were operated. In addition new canneries were opened by the St. Elias Packing Co., at Alsek, in southeast Alaska, by the Northwestern Fisheries Co., at Kenai, on Cook Inlet (succeeding the mild-curing plant formerly operated by the San Juan Fishing & Packing Co.), and by the Columbia River Packers Association, at Chignik, in central Alaska. The cannery of the Alaska Salmon Co., on Wood River, western Alaska, which was closed down in 1909, owing to the loss of its supply ship, was operated this year.

New canneries which will likely be finished in time to operate in 1911 are the Hawk Fishing Co., at Hawk Inlet, Tee Harbor Packing Company, at Tee Harbor, southeast Alaska, and the Alaska Packers Association, at Naknek, western Alaska. For some years the Alaska Packers Association has operated two canneries at Karluk, on Kodiak Island. Karluk has no harbor, except for boats drawing less than 4 feet of water, and the association, fearing a repetition of the disaster of 1907, when the bark *Servia*, with a full cargo of salmon, was driven ashore in a gale and totally destroyed, began in 1909 the erection of a new cannery at Larsen Bay, a well-sheltered spot near by. This establishment will operate in 1911, the two Karluk canneries being held in reserve. Fishing will be carried on as usual at Karluk, the fish being transported to the new cannery. C. A. Burckhardt & Co., who now operate two canneries in southeast Alaska, have bought the saltery formerly owned by Mrs. A. E. King, at Sunny Point, southeast Alaska, and will convert this into a one-line cannery. The Alaska Fishermen's Packing Co. have purchased the Nelson, Olsen & Co. saltery in Kvichak Bay, western Alaska, and will replace the old plant by a one-line cannery. Several canneries are also engaged in making, or are contemplating, extensive changes to and enlargements of their present plants.

On August 10 the cannery of the Alaska-Portland Packers' Association, at Snag Point, Nushagak Bay, was completely destroyed by fire. The warehouse alongside, with much of the gill-netting and all of the trap web, together with part of the season's pack, was also consumed. The bunk houses, store, office, and residence, and the floating property, were saved. The property loss was about $200,000, partly covered by insurance. The company will rebuild next spring and hopes to have the cannery completed in time to operate that season.

On the night of September 12 fire broke out in the cannery of Gorman & Co., at Kasaan, in southeast Alaska, and resulted in the total destruction of the cannery, warehouse, store, hotel, and part of the season's pack. The company will erect a new cannery in time to operate next season.

Several canneries packed some thousands of cases of salmon in the new seamless or sanitary can with such success that it is probably a question of but a few seasons until this will be the only form of can in use in Alaska.

The two cannery fires resulted in the loss of the following cases of salmon:

	Cases.
Cohos, 1-pound tall	1,552
Chums, 1-pound tall	4,896
Pinks, ½-pound flat	141
Pinks, 1-pound tall	11,956
Reds, 1-pound tall	22,178
Total	40,723

These have been included in the statistical tables, as they had passed through all the stages of packing and were eventually paid for by the insurance companies.

CANNERIES IN OPERATION.

Following is a list of the canneries operated during the season of 1910:

Name.	Location.
Southeast Alaska:	
John L. Carlson & Co	Taku Harbor.
George T. Myers & Co	Sitkoh Bay.
Yakutat & Southern Railway Co	Yakutat.
Astoria & Puget Sound Canning Co	Excursion Inlet.
Pacific American Fisheries	Do.
Northwestern Fisheries Co	Dundas Bay, Quadra Bay, Santa Ana, Hunter Bay.
North Pacific Trading & Packing Co	Klawak.
Fidalgo Island Packing Co	Ketchikan.
Shakan Salmon Co	Shakan.
Gorman & Co	Kasaan.
F. C. Barnes Co. (Inc.)	Lake Bay.
Thlinket Packing Co	Funter Bay.
Alaska Packers Association	Loring and Wrangell.
St. Elias Packing Co	Alsek River.
Pillar Bay Packing Co	Point Ellis.
Metlakahtla Industrial Co	Metlakahtla.
Pacific Coast & Norway Packing Co	Petersburg.
Yes Bay Canning Co	Yes Bay.
Chilkoot Fisheries Co	Chilkoot Inlet.
Central Alaska:	
Northwestern Fisheries Co	Chignik, Uyak, Kenai, and Orca.
Alaska Packers Association	Kasilof, Karluk (2), Alitak, and Chignik.
Columbia River Packers' Association	Chignik.
Western Alaska:	
Alaska Packers Association	Nushagak Bay (2), Kvichak Bay (2), Naknek River (2), and Ugaguk River.
North Alaska Salmon Co	Kvichak Bay, Nushagak Bay, Ugaguk River, and Lockanok.
Northwestern Fisheries Co	Nushagak Bay.
Naknek Packing Co	Naknek River.
Red Salmon Canning Co	Ugashik River.
Alaska-Portland Packers Association	Nushagak Bay.
Bristol Bay Packing Co	Kvichak Bay.
Alaska Fishermen's Packing Co	Nushagak Bay.
Columbia River Packers Association	Do.
Alaska Salmon Co	Wood River.

Persons engaged.—The fishermen engaged this year numbered 3,722, of whom slightly more than one-half were white. The cannery employees numbered 8,194, of whom all nationalities show increases as compared with 1909. The transporters numbered 515, an increase over 1909. All branches of the industry show increases as compared with 1909. In all, 12,431 persons were employed, an increase of 1,909 over 1909.

PERSONS ENGAGED IN THE SALMON-CANNING INDUSTRY IN 1910.

Occupation and race.	Southeast Alaska.	Central Alaska.	Western Alaska.	Total.
Fishermen:				
Whites	444	485	1,541	2,470
Indians	1,153	80		1,233
Japanese	10		9	19
Total	1,607	565	1,550	3,722
Shoresmen:				
Whites	529	359	1,203	2,091
Indians	1,060	121	326	1,507
Chinese	705	467	1,216	2,388
Japanese	472	393	1,323	2,188
Koreans		4		4
Filipinos			16	16
Total	2,766	1,344	4,084	8,194
Transporters:				
Whites	184	111	189	484
Indians	23	2		25
Chinese		1		1
Japanese	2	3		5
Total	209	117	189	515
Grand total:				
Whites	1,157	955	2,933	5,045
Indians	2,236	203	326	2,765
Chinese	705	468	1,216	2,389
Japanese	484	396	1,332	2,212
Koreans		4		4
Filipinos			16	16
Total	4,582	2,026	5,823	12,431

Investments, wages, etc.—There were 52 canneries in operation—23 in southeast Alaska, an increase of 4 over 1909; 10 in central Alaska, an increase of 2 over 1909; and 19 in western Alaska, an increase of 1 over 1909; a total increase for all Alaska of 7.

There were 176 steamers and launches over 5 tons, 55 under 5 tons, and 59 sailing vessels engaged in transporting supplies and the pack, and doing general work for the canneries. This is a large increase over 1909.

All forms of apparatus except floating traps show increases over 1909. The increases are especially noticeable in purse seines and stake traps, which increased in number 43 and 27 respectively.

Included in this table for the first time are the items of cash capital, materials used, and wages paid. Considerable misapprehension

seems to have arisen among readers of this report as to the profits of the cannerymen, which have appeared to them enormous. Such an erroneous conclusion is apparently based on the assumption that the price received for the canned product represents practically net profits. For eight years prior to the 1910 season but few of the cannerymen received an adequate return upon the capital invested, while many of them sustained heavy losses during certain years. It has been found difficult to secure accurate data showing the cost of operation, and several items, such as insurance, taxes outside of Alaska, commissions paid the brokers, etc., have not been taken into account, but it is hoped in time to include these.

INVESTMENT IN THE SALMON-CANNING INDUSTRY IN 1910.

Items.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Number.	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*
Canneries	23	...	10	...	19	...	52	...
Transporting vessels:								
Steamers and launches over 5 tons	110	$310,450	24	$212,050	42	$605,950	176	$1,128,450
Tonnage	1,186	...	1,077	...	2,507	...	4,770	...
Outfit	...	175,000	...	72,000	...	104,000	...	351,000
Sailing	16	160,250	11	348,000	32	711,000	59	1,219,250
Tonnage	6,332	...	17,160	...	41,748	...	65,240	...
Outfit	...	30,000	...	20,000	...	48,000	...	98,000
Steamers and launches under 5 tons	39	86,300	10	24,025	6	13,700	55	124,025
Boats, sail and row	541	36,163	263	23,990	822	178,140	1,626	238,293
Lighters and scows	108	46,983	108	57,800	130	107,529	346	212,312
Pile drivers	22	45,197	21	46,300	17	38,300	60	129,797
Apparatus:								
Haul seines	45	9,372	24	18,100	...	...	69	27,472
Purse seines	133	38,784	...	...	...	...	133	38,784
Gill nets	271	31,134	127	16,545	880	88,957	1,278	136,636
Traps, stake	41	109,550	38	51,162	14	19,500	93	180,212
Traps, floating	13	22,728	1	1,500	...	...	14	24,228
Spears	75	75	...	...	...	...	75	75
Cash on hand	...	230,000	...	100,000	...	190,000	...	520,000
Shore and accessory property	...	2,016,144	...	1,291,405	...	2,913,008	...	6,220,557
Materials used	...	1,964,493	...	778,531	...	1,646,775	...	4,389,799
Wages paid	...	1,100,678	...	638,886	...	1,562,295	...	3,301,859
Total	...	6,413,301	...	3,700,294	...	8,227,154	...	18,340,749

Output.—The table of products shows the quantity and value of each species packed, with size and style of cans. As usual, western Alaska leads in value of the pack, but southeast Alaska leads in quantity packed. Red, or sockeye, salmon predominate in central and western Alaska, while humpback, or pink, salmon predominate in southeast Alaska.

OUTPUT OF SALMON FROM THE CANNERIES IN 1910, BY SPECIES AND SIZE OF CANS.[a]

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Cases.	*Value.*	*Cases.*	*Value.*	*Cases.*	*Value.*	*Cases.*	*Value.*
Coho, or silver:								
½-pound flat	326	$1,299	...	...	...	...	326	$1,299
1-pound flat	2,249	12,357	...	...	...	...	2,249	12,357
1-pound tall	80,045	391,251	19,928	$99,103	11,641	$55,656	111,614	546,010
Total	82,620	404,907	19,928	99,103	11,641	55,656	114,189	559,666
Dog, or chum:								
1-pound tall	231,735	703,555	131	403	22,352	69,451	254,218	773,409
Humpback, or pink:								
½-pound flat	6,375	15,871	...	...	...	...	6,375	15,871
1-pound flat	7,900	35,550	...	...	...	...	7,900	35,550
1-pound tall	480,088	1,513,937	31,797	101,380	31,348	97,317	543,233	1,712,634
Total	494,363	1,565,358	31,797	101,380	31,348	97,317	557,508	1,764,055
King, or spring:								
½-pound flat	108	432	...	...	...	...	108	432
1-pound tall	294	1,566	15,786	85,235	24,087	127,569	40,167	214,370
Total	402	1,998	15,786	85,235	24,087	127,569	40,275	214,802
Red, or sockeye:								
½-pound flat	43,166	170,489	...	...	1,474	5,896	44,640	176,385
1-pound flat	39,941	236,453	...	...	...	...	39,941	236,453
1-pound tall	199,158	1,059,976	364,875	1,959,539	823,973	4,342,037	1,388,006	7,361,552
Total	282,265	1,466,918	364,875	1,959,539	825,447	4,347,933	1,472,587	7,774,390
Grand total	1,091,385	4,142,736	432,517	2,245,660	914,875	4,697,926	2,438,777	11,086,322

[a] All pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans. Reduced to a common basis of cases containing 48 1-pound cans, the pack is 2,413,052½ cases.

Comparison of pack of 1907, 1908, 1909, and 1910.—With the exception of 1908, the pack of 1910 exceeds in quantity that of any of the four years, and it exceeds in value any of them, being the most valuable pack ever put up in Alaska.

COMPARISON OF THE OUTPUT OF THE SALMON CANNERIES IN 1907, 1908, 1909, AND 1910.[a]

Products.	1907		1908		1909		1910	
	Cases.	*Value.*	*Cases.*	*Value.*	*Cases.*	*Value.*	*Cases.*	*Value.*
Coho, or silver:								
½-pound flat	969	$4,273	209	$627	...	...	326	$1,299
1-pound flat	3,933	17,292	2,414	9,903	1,206	$5,543	2,249	12,357
1-pound tall	80,772	315,819	66,309	263,559	55,350	225,486	111,614	546,010
Total	85,674	337,384	68,932	274,089	56,556	231,029	114,189	559,666
Dog, or chum:								
½-pound flat	491	1,228	...	...	...	...	...	...
1-pound flat	664	2,125	107	321	...	...	...	...
1-pound tall	183,262	544,404	218,406	553,876	120,712	274,110	254,218	773,409
Total	184,417	547,757	218,513	554,197	120,712	274,110	254,218	773,409
Humpback, or pink:								
½-pound flat	17,589	46,093	...	...	...	...	6,375	15,871
1-pound flat	7,406	26,662	569	1,590	...	...	7,900	35,550
1-pound tall	545,772	1,726,525	643,564	1,731,789	464,873	1,114,839	543,233	1,712,634
Total	570,767	1,799,280	644,133	1,733,379	464,873	1,114,839	557,508	1,764,055
King, or spring:								
½-pound flat	28	98	125	425	...	...	108	432
1-pound tall	43,410	181,620	23,667	99,442	48,034	207,624	40,167	214,370
Total	43,438	181,718	23,792	99,867	48,034	207,624	40,275	214,802
Red, or sockeye:								
½-pound flat	45,383	160,731	21,817	68,083	16,385	63,888	44,640	176,385
1-pound flat	29,821	154,646	26,950	138,120	85,193	236,609	39,941	236,453
1-pound tall	1,242,600	5,599,850	1,613,911	7,318,048	1,611,916	7,310,053	1,388,006	7,361,552
Total	1,317,804	5,915,227	1,662,678	7,524,251	1,713,494	7,610,550	1,472,587	7,774,390
Grand total	2,202,100	8,781,366	2,618,048	10,185,783	2,403,669	9,438,152	2,438,777	11,086,322

[a] All pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans.

The following table shows, by species, the average price received by the packer per case of 1-pound talls for a series of years. The 1-pound tall cases are used because they form the vast majority of the pack and are the ones in common use by the consumer, the flat cans being packed for a special trade.

AVERAGE ANNUAL PRICE PER CASE OF 48 1-POUND TALL CANS OF SALMON, 1905–1910.

Products.	1905	1906	1907	1908	1909	1910
Coho, or silver	$3.20	$3.63	$3.91	$3.98	$4.07	$4.89
Dog, or chum	2.69	2.87	2.97	2.53	2.28	3.04
Humpback, or pink	2.95	3.00	3.16	2.69	2.40	3.15
King, or spring	3.28	3.78	4.18	4.20	4.32	5.34
Red, or sockeye	3.38	3.77	4.59	4.52	4.53	5.30

PICKLING.

Owing to the low prices which have prevailed during several seasons for whole pickled salmon, there was but little incentive for the salteries to engage in this business very heavily this year. Some shut down altogether, while others very materially curtailed operations. Prices improved during the latter part of the season, but it was then too late.

The action of the Department in forbidding the packing of salmon bellies without making some economic use of the backs contributed to the depression in the pickled trade, as bellies were the most remunerative product prepared. Nearly all of the salters are now agreed, however, that this action was wise and necessary. Under the old wasteful method from one-half to two-thirds of the edible portion of the fish was thrown away and the belly only was pickled.

Persons engaged.—This year 261 persons (196 fishermen, 51 shoresmen, and 14 transporters) were employed, a decrease of 135 as compared with 1909.

PERSONS ENGAGED IN THE SALMON-PICKLING INDUSTRY IN 1910.

How engaged.	Southeast Alaska.	Central Alaska.	Western Alaska.	Total.
Fishermen:				
Whites	29	3	46	78
Indians	13	105	....	118
Total	42	108	46	196
Shoresmen:				
Whites	5	7	20	32
Indians	16	3	....	19
Total	21	10	20	51
Transporters:				
Whites	2	2	4	8
Indians	....	6	....	6
Total	2	8	4	14
Grand total	65	126	70	2[illegible]1

Investment.—There were 12 salteries (6 in southeast Alaska, 4 in central Alaska, and 2 in western Alaska) in operation, a decrease of 4 as compared with 1909. In addition, a few of the canneries and mild-curing plants also pickled their surplus catch, and while the product has been included in the present table, the men and investment could not be separated from the statistics of the other branches of the industry.

INVESTMENT IN THE SALMON-PICKLING INDUSTRY IN 1910.

Items.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	No.	*Value.*	*No.*	*Value.*	*No.*	*Value.*	*No.*	*Value.*
Salteries	6		4		2		12	
Transporting vessels:								
Steamers and launches	1	$2,500	1	$12,000	1	$5,000	3	$19,500
Tonnage	7		40		9		56	
Outfit		500		2,400		1,600		4,500
Sailing	1	900					1	900
Tonnage	16						16	
Outfit		200						200
Launches under 5 tons	5	6,550	1	1,000	1	4,500	7	12,050
Boats, row and sail	16	870	39	1,160	23	8,700	78	10,730
Lighters and scows	5	400	2	200			7	600
Apparatus:								
Haul seines	2	350	22	2,230			24	2,580
Purse seines	10	2,800					10	2,800
Gill nets	6	800			23	1,725	29	2,525
Cash capital		8,200		11,250		35,000		54,450
Shore and accessory property		15,300		9,500		27,000		51,800
Wages paid		5,925		16,577		22,590		45,092
Total		45,295		56,317		106,115		207,727

Output.—The output in 1910 amounted to 14,405 barrels, valued at $130,641, as compared with 26,915 barrels and 6,997 half barrels, valued at $208,758, in 1909. A small part of this output is composed of salmon bellies. A few of the backs were pickled and appear in this table, while the rest were either dried, dry-salted, or smoked, and appear under their proper headings in this report.

BARRELS OF SALMON PICKLED IN 1910, BY SPECIES.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	No.	*Value.*	*No.*	*Value.*	*No.*	*Value.*	*No.*	*Value.*
Coho, or silver	35	$296	125	$1,208			160	$1,504
Coho bellies			126	1,135			126	1,135
Dog, or chum, bellies	70	770					70	770
Humpback, or pink	314	1,905	13	78	3	$15	330	1,998
Humpback bellies	421	4,410	195	1,725			616	6,135
King, or spring					352	3,399	352	3,399
King fins	2	24					2	24
King bellies	6	128					6	128
Red, or sockeye	2	20	1,485	12,278	10,444	92,351	11,931	104,649
Red tips					4	60	4	60
Red bellies	3	24	805	10,815			808	10,839
Total	853	7,577	2,749	27,239	10,803	95,825	14,405	130,641

MILD CURING.

At the opening of the present season the mild-curing industry was in better condition than for several years previous, as the pack of 1909 had been disposed of and prices for the new pack were ruling fairly high. Owing to this the packers extended their operations as much as possible, and as a result the pack this year is the largest ever put up in Alaska.

With the exception of a small quantity put up in Cook Inlet, central Alaska, the packing of mild-cured salmon was confined to southeast Alaska, although it is more than probable that the packers will soon extend their operations into western Alaska and parts of central Alaska not now worked.

As in previous years the principal trouble the packers experience is in getting rid of the white-meated king salmon with the least possible loss. These fish average about one-fourth of the total catch, and the fishermen insist that the dealers shall take them along with the others, which they do at a considerably lower price. A few of the larger of these white-meated kings are mild-cured. Early in the season many of them, together with the small red-meated fish, are shipped fresh to the Puget Sound ports, but after the kings begin to run in the Sound this is unprofitable.

Persons engaged.—This year 656 persons (560 fishermen, 68 shoresmen, and 28 transporters) were engaged in the mild-curing industry, as compared with 521 in 1909, a gain of 135. A number of others also were engaged for limited periods, but as their work in connection with other branches of the salmon business was more important they have been included there.

PERSONS ENGAGED IN THE SALMON MILD-CURING INDUSTRY IN 1910.

Occupation and race.	Southeast Alaska.	Central Alaska.	Total.
Fishermen:			
Whites	354	10	364
Indians	196	....	196
Total	550	10	560
Shoresmen:			
Whites	65	....	65
Indians	3	....	3
Total	68	....	68
Transporters:			
Whites	15	....	15
Indians	13	....	13
Total	28	....	28
Grand total	646	10	656

Investment.—There were 14 fixed plants (13 in southeast Alaska and 1 in central Alaska)—i. e., plants with permanent buildings and a chief business of mild-curing salmon—operated in Alaska this year. A considerable part of this industry is done by schooners and launches, the crews of which catch the fish in small boats and pack them aboard the vessels, moving from place to place with the schools of salmon.

INVESTMENT IN THE SALMON MILD-CURING INDUSTRY IN 1910.

Items.	Southeast Alaska.		Central Alaska.		Total.	
	No.	*Value.*	*No.*	*Value.*	*No.*	*Value.*
Fixed plants	13		1		14	
Transporting vessels:						
Steamers and launches (over 5 tons)	23	$51,500			23	$51,500
Tonnage	179				179	
Outfit		35,000				35,000
Sailing vessels	2	4,000			2	4,000
Tonnage	67				67	
Outfit		3,000				3,000
Steamers and launches (under 5 tons)	35	[a] 42,750			35	42,750
Boats, sail and row	402	14,365	5	$1,000	407	15,365
Scows	20	10,100			20	10,100
Apparatus, shore fisheries:						
Gill nets	138	26,225	5	750	143	26,975
Lines, trolling		471				471
Shore and accessory property		40,920				40,920
Cash capital		86,000				86,000
Wages paid		46,537		1,200		47,737
Total		360,868		2,950		363,818

[a] Includes outfit.

Catch, by apparatus and products.—All told, 164,520 red-meated and 22,525 white-meated king salmon were required in preparing the pack. The greater part of these fish were caught with trolling lines. The pack of 3,357 tierces, which sold for $220,673, is an increase of 1,065 tierces and $71,373 over 1909.

CATCH OF SALMON FOR MILD-CURING, 1910, BY APPARATUS AND SPECIES.

Apparatus and species.	Southeast Alaska.	Central Alaska.	Total.
Gill nets:	*Number.*	*Number.*	*Number.*
Red king salmon	20,864	1,767	22,631
White king salmon	2,656		2,656
Total	23,520	1,767	25,287
Lines:			
Red king salmon	141,889		141,889
White king salmon	19,869		19,869
Total	161,758		161,758
Grand total	185,278	1,767	187,045

PRODUCTS OF THE SALMON MILD-CURING INDUSTRY IN 1910.

Products.	Tierces.	Round weight of fish.	Dressed weight of fish.	Value.
Southeast Alaska:		*Pounds.*	*Pounds.*	
Red king salmon	3,022	3,475,300	2,468,198	$209,826
White king salmon	304	349,600	246,700	8,615
Total	3,326	3,824,900	2,714,898	218,441
Central Alaska:				
Red king salmon	31	35,650	24,800	2,232
Total:				
Red king salmon	3,053	3,510,950	2,492,998	212,058
White king salmon	304	349,600	246,700	8,615
Grand total	3,357	3,860,550	2,739,698	220,673

FRESH SALMON.

As in previous years large quantities of king salmon (mainly white-meated and small red-meated fish) were shipped fresh to Puget Sound ports, where they brought very good prices up to the time king salmon began to run in the Sound waters.

Shortly after the canning season opened certain fishermen with headquarters at Petersburg and Wrangell became dissatisfied with the prices offered by neighboring canneries, and failing to come to an agreement began shipping their catches of red and coho salmon fresh to Puget Sound ports, where they received fair prices.

MINOR PRESERVING PROCESSES.

Dry salting and drying.—At a few places in central Alaska the bellies of red and coho salmon are cut out and pickled, after which the backs are dried in the sun, and the resulting product, called "ukalu," used for fox food at the fox ranches and for dog food.

The dry salting of dog salmon for food has almost ceased, but 22,178 pounds, valued at $554, being prepared this year.

Smoking.—A delicious smoked product, known locally as "beleke," is put up at Kodiak and several other places, the backs of red, coho, and humpback salmon being used. A considerable quantity of white-meated king salmon, cut into steaks, was smoked in southeast Alaska this year.

Freezing.—The only establishments engaged in freezing salmon are at Taku Harbor and Ketchikan, in southeast Alaska. Only a small business is done in the freezing of salmon, halibut being the principal product of these plants. Black bass, black cod, and steelhead trout are among the miscellaneous products prepared.

RETURN OF MARKED SALMON.

A number of salmon bearing mutilations of certain fins, apparent brands, or with missing fins, were observed during the summer, as occurs every season. So far as these concern single fins they are not to be referred to any known artificial marks placed upon fish as a means of identification. Twelve of them, however, were red salmon lacking both ventral fins and are identified as returns from a definite marking experiment which has yielded annual results since 1906. This continued return of marked red salmon to southeast Alaska is of particular interest. These fish were marked by Mr. F. M. Chamberlain as fingerlings about three months old, in August, 1903, at Fortmann hatchery, and liberated in Naha Stream above Heckman Lake. The mark consisted of the complete excision of both ventral fins. The number of marked fish liberated was 1,600. The returns which are considered to have been satisfactorily identified are shown, by the year and locality, in the following table:

MARKED SALMON IDENTIFIED UPON RETURN TO STREAMS, 1906-1910.

Years.	Naha.	Yes Bay.	Karluk.	Total.	Age of fish.
					Years.
1906	2			2	$3\frac{1}{2}$
1907	13			13	$4\frac{1}{2}$
1908	5	3		8	$5\frac{1}{2}$
1909		4	1	5	$6\frac{1}{2}$
1910	1	10	1	12	$7\frac{1}{2}$
Total	21	17	2	40	

One of the 10 fish credited to Yes Bay in 1910 was caught in the bay by commercial fishermen and preserved by freezing at Ketchikan, where it was examined by the assistant agent on July 23. It was a male 20.5 inches in length and weighed $3\frac{3}{4}$ pounds. All the other marked fish assigned to Yes Bay for any year were taken at the Government hatchery at the head of Yes Lake.

These 40 fish are $2\frac{1}{2}$ per cent of the 1,600 marked. The observed return is certainly somewhat larger and possibly greatly surpasses these figures. An indeterminate number, estimated at between 50 and 100, were reported to have been seen at Yes Lake hatchery in 1906, but of these no specimens were saved. No account has been taken of these in the above table, since there is no basis for determining how many of the presumed marks were certainly of the same nature as those accepted as representing actual returns. Salmon lacking a single ventral fin are frequently seen in the runs, and some mutilations of this pair of fins are to be distinguished from the results of artificial marking. While the table shows but one marked fish

taken at Karluk in 1909, several were reported, the exact number being unknown. The one of which account has been taken is based upon examination of a preserved specimen. The few taken at Karluk are the only specimens known to have returned outside of southeast Alaska.

The relation of the return to the parent stream and adjoining streams of southeast Alaska, in which most of the marked fish were retaken, is of importance. Excluding the uncertain return to Yes Bay in 1906, over half the returning fish succeeded in reaching the parent stream, and even with these Yes Bay fish included, a considerable proportion still belongs to the parent stream, while by far the larger part of the known return is confined to the region within 40 miles of the parent stream. It is obviously indicated that red salmon return to the general region in which they were hatched, rather than to remote regions, and that a considerable number reach the particular region of their origin, or their parent stream.

The return from the original plant of marked fish has now covered five successive seasons, indicating a variation of at least five years in the life period of a single hatch of red salmon. The known return had been diminishing in numbers since 1907 up to the current year, when it considerably increased. This is a somewhat anomalous result, and inconsistent with that gradual dwindling in numbers and disappearance from the runs of fish bearing this mark which was expected to occur. While the acceptance of these fish as conclusively indentical with the marked salmon of 1903 depends on the cessation of their occurrence within a reasonable time, there is at present no sufficient reason for doubting that they are the same.

OBSERVATIONS IN WOOD RIVER REGION.

Mr. H. C. Fassett, inspector of fisheries in Alaska, represented the Bureau in western Alaska, with headquarters on Nushagak Bay, and had charge of the investigations in the Nushagak region. The order closing both Wood and Nushagak Rivers was uniformly observed, and without its restrictive effect a considerable proportion of the reduced quota escaping to the spawning grounds through Wood River would have been taken. Eight fish traps were operated on the bay and two in Igushik River, the latter yielding but few fish. The total take of traps was about 596,000, of which about 29 per cent were red salmon. These traps took 11.2 per cent of the whole catch of the Nushagak region, and 3.9 per cent of the whole red salmon catch.

The following table shows the total Nushagak catch (including 85,000 red salmon from Igushik River) and its content as to the five species of salmon. The red salmon catch is 83.5 per cent of the total number of salmon taken.

CATCH OF DIFFERENT SPECIES OF SALMON IN NUSHAGAK REGION, 1910.

Species.	Catch.	Species.	Catch.
King	86,433	Pink	440,369
Red	4,427,626	Dog	206,220
Coho	139,200	Total	5,299,848

COUNT OF THE BREEDING RUN IN WOOD RIVER.

The count of salmon escaping from the fishermen and ascending to the spawning grounds by way of Wood River was again made as in the two past years. The actual daily tally made at the rack at the foot of Lake Aleknagik is as follows:

DAILY TALLY OF REDFISH INTO LAKE ALEKNAGIK DURING THE SEASON OF 1910.

Date.	Number.	Date.	Number.	Date.	Number.
July 4	167	July 15	125,621	July 26	1,162
5	1,042	16	64,026	27	927
6	2,717	17	29,964	28	715
7	12,036	18	31,628	29	873
8	13,131	19	13,642	30	708
9	72,073	20	10,928	31	385
10	105,835	21	10,000	Aug. 1	361
11	70,252	22	4,881	2	139
12	26,772	23	3,618		
13	24,223	24	2,747	Total	670,104
14	37,612	25	1,919		

The run came into Nushagak Bay about July 3. The rack at the lake was completed and made tight on July 3, but no fish were seen until the 4th. The tally of July 7 probably represents the advance of the main run. As in the preceding year, there were two distinct impulses in the run at the lake, the height of the run or largest tally occurring on the 15th, or one day later than in the two preceding seasons.

RECORD OF METEOROLOGICAL OBSERVATIONS AT THE SALMON RACK AT LAKE ALEKNAGIK, ALASKA, DURING SEASON OF 1910.

Date.	Hour.	Temperatures. Air. At reading.	Temperatures. Air. Maximum.	Temperatures. Air. Minimum.	Temperatures. Lake at 6 feet depth.	Barometer reading.	Weather conditions. Clouds in sky (amount 1 to 10).	Weather conditions. Wind (force and direction).	Weather conditions. Rainfall (heavy, moderate, light, trace).	Lake conditions. Depth at rack-gate.	Lake conditions. Current at rack (per minute).	Lake conditions. Drift (much, little, none).	Remarks.
						Inches.				*Ft. in.*	*Feet.*		
June 25	12 m.	53	58	51	40	30.16	10	SE. light				Much	
	6 p. m.	50	52	50	40	30.19	10	S. light		11 5		Much	
	12 p. m.	42	49	42	40	30.17	10	SW. light	Trace			Much	
26	6 a. m.	40	42	37	39	30.21	10	SW. light				Much	
	12 m.	43	43.5	39.5	39.5	30.20	10	N. light		11 3		Little	
	6 p. m.	43.5	46.5	40.0	39.5	30.17	10	Calm	Trace			Little	Lake like glass.
	12 p. m.	39.5	43.0	38.5	39.6	30.15	10	S. light	Little			Little	
27	6 a. m.	42.0	42.5	39.0	40.0	30.14	10	NW. moderate	Trace			Little	Heavy mist.
	12 m.	45.2	44.6	40.8	40.0	30.13	10	SW. moderate	Light	11 1		Little	
	6 p. m.	44.6	44.8	43.5	39.6	30.15	10	SSE. moderate	Light			Little	
	12 p. m.	41.5	44.0	41.0	39.6	30.17	10	S. moderate	Light			Little	
28	6 a. m.	40.2	41.0	38.5	39.6	30.19	10	SW. moderate	Light			Little	
	12 m.	44.2	43.2	39.0	39.6	30.20	10	SW. light	Light	11 0		Little	
	6 p. m.	45.0	52.5	43.2	39.8	30.18	10	W. light	None			Little	
	12 p. m.	42.0	42.2	41.8	39.8	30.19	10	SW. light	Mist			Little	
29	6 a. m.	41.2	42.0	37.5	40.0	30.15	10	WSW. light	Mist			Little	Thick fog.
	12 m.	50.0	49.3	37.6	40.5	30.12	10	NNE. moderate	None	11 0		Little	
	6 p. m.	44.0	49.7	44.0	40.0	30.11	10	SE. light	Light			Little	
	12 p. m.	43.5	43.8	42.0	40.0	30.10	10	S. light	Light			Little	
30	6 a. m.	43.0	43.0	39.8	40.0	30.14	10	SW. light	Light			Little	
	12 m.	42.2	43.8	40.0	39.8	30.19	10	SE. light	Light	11 1		Little	
	6 p. m.	45.5	45.0	43.0	40.0	30.17	10	ESE. light	None			Little	
	12 p. m.	43.0	45.0	42.0	39.8	30.17	10	S. moderate	Light			Little	
July 1	6 a. m.	42.8	45.0	39.8	40.0	30.05	10	E. light	Light			Little	
	12 m.	47.0	48.0	42.6	39.8	29.99	10	W. light	Light	11 3		Little	
	6 p. m.	45.2	48.5	43.0	40.0	29.93	10	E. light	Light			Little	
	12 p. m.	43.0	45.8	42.8	40.0	29.91	10	NW. light	Light			Little	
2	6 a. m.	43.5	44.0	41.2	40.0	29.87	10	NW. light	Light			Little	
	12 m.	50.2	50.0	43.0	40.2	29.81	10	NW. light	None	11 5		Little	
	6 p. m.	54.5	53.8	49.0	40.6	29.75	10	W. light	Light			Much	
	12 p. m.	49.0	51.2	49.2	40.0	29.75	10	NW. light	None			Much	
3	6 a. m.	42.6	44.8	41.2	40.0	29.73	10	N. light	None			Much	
	12 m.	49.2	49.5	42.7	40.8	29.75	10	S. light	Light	11 6		Much	
	6 p. m.	46.0	52.8	43.5	40.0	29.75	10	S. light	None			Much	
	12 p. m.	45.0	45.0	43.0	40.0	29.75	10	N. light	Light	11 6		Much	
4	6 a. m.	51.0	51.0	43.0	40.7	29.84	9	N., light	None	11 7		Much	
	12 m.	63.0	63.2	42.0	41.0	29.87	9	SE., light	None	11 7.5		Much	

RECORD OF METEOROLOGICAL OBSERVATIONS AT THE SALMON RACK AT LAKE ALEKNAGIK, ALASKA, DURING SEASON OF 1910—Continued.

Date.	Hour.	Temperatures. Air. At reading.	Air. Maximum.	Air. Minimum.	Lake at 6 feet depth.	Barometer reading.	Weather conditions. Clouds in sky (amount 1 to 10).	Wind (force and direction).	Rainfall (heavy, moderate, light, trace).	Lake conditions. Depth at rack-gate. Ft.	in.	Current at rack (per minute).	Drift (much, little, none).	Remarks.
						Inches.				Ft.	in.	Feet.		
July 4	6 p. m.	59.8	65.1	56.0	41.0	29.91	10	NW., light	Light	11	7.2		Much	Showers in p. m.
	12 p. m.	46.2	61.0	46.0	41.0	29.96	10	NE., light	None	11	7.6		Little	
5	6 a. m.	50.2	69.8	41.0	40.8	30.03	9	N., light	None	11	7.7		Little	
	12 m.	61.8	63.5	41.6	41.0	30.10	8	SE., moderate	None	11	7.7		Much	
	6 p. m.	64.2	63.5	55.5	41.5	30.11	8	S., light	None	11	7.5		Much	
	12 p. m.	44.6	67.0	44.6	41.0	30.12	3	N., light	None	11	7.5		Much	
6	6 a. m.	50.7	51.0	37.5	41.0	30.21	2	W., light	None	11	7.6		Much	
	12 m.	76.2	78.0	52.5	41.0	30.24	6	S., light	None	11	7.5		Much	Hot sunshine.
	6 p. m.	60.2	78.0	59.2	41.0	30.25	3	SE., moderate	None	11	7.0		Much	
	12 p. m.	50.0	60.8	50.0	41.0	30.30	8	SE., light	None	11	7.0		Much	
7	6 a. m.	44.8	44.8	37.2	41.0	30.32	9	ESE., moderate	None	11	7.0		Much	More drift than usual.
	12 m.	57.2	57.0	42.1	41.8	30.33	7	SE., light	None	11	7.0	140	Much	
	6 p. m.	55.1	62.8	51.2	42.0	30.33	8	W., light	None	11	6.7		Much	
	12 p. m.	43.2	68.0	43.2	42.0	30.33	9	ESE., light	None	11	6.7		Much	
8	6 a. m.	42.2	43.0	40.7	41.0	30.33	7	E., light	None	11	6.6		Much	
	12 m.	62.5	60.0	40.2	41.2	30.33	2	S., light	None	11	6.2	180	Little	
	6 p. m.	69.1	67.8	59.0	42.0	30.27	3	W., light	None	11	5.8		Little	
	12 p. m.	52.2	66.2	48.5	42.0	30.24	8	NE., light	None	11	5.7		Much	
9	6 a. m.	52.6	53.0	42.5	42.0	30.19	7	NE., fresh	None	11	5.6		Little	
	12 m.	60.2	65.2	52.5	42.0	30.16	9	NE., light	None	11	5.2	180	Little	
	6 p. m.	52.2	61.0	51.0	41.0	30.15	10	SW., light	None	11	5.0		Little	Gloomy and threatening.
	12 p. m.	48.8	52.8	48.8	41.0	30.18	10	N., light	None	11	4.2		Little	
10	6 a. m.	49.9	48.9	46.0	41.0	30.21	10	SW., light	None	11	4.0		Little	
	12 m.	59.2	59.4	49.5	42.5	30.22	8	WSW., light	None	11	3.8	185	Little	
	6 p. m.	57.7	68.8	51.2	43.5	30.15	7	WSW., light	None	11	3.5		Little	
	12 p. m.	58.1	57.6	53.6	43.5	30.15	4	NW., light	None	11	3.1		Little	
11	6 a. m.	50.2	55.2	45.0	42.0	30.11	7	NW., light	None	11	2.7		Little	
	12 m.	59.7	72.2	50.0	44.8	30.11	10	S., light	None	11	2.4	190	Little	
	6 p. m.	61.0	71.2	56.8	43.0	30.09	8	W., fresh	None	11	2.0		Little	
	12 p. m.	48.4	59.2	47.5	42.0	30.09	8	W., light	None	11	1.8		Little	
12	6 a. m.	46.2	49.8	40.2	41.2	30.14	9	WSW., light	None	11	1.0		Much	
	12 m.	76.1	77.2	46.4	43.2	30.15	6	W., light	None	11	0.8	185	Much	
	6 p. m.	51.3	77.2	50.0	44.0	30.15	2	SW., fresh	None	11	0.5		Much	
	12 p. m.	44.2	50.8	43.0	42.0	30.20	2	N., light	None	11	0.2		Much	
13	6 a. m.	48.0	48.8	41.4	42.0	30.21	1	NW., light	None	10	11.5		Little	
	12 m.	57.8	57.2	42.7	45.0	30.22	4	W., heavy	None	10	11.0	180	Much	Hard blow from west.
	6 p. m.	53.8	58.2	49.3	45.0	30.22	3	N., light	None	10	10.5		Much	

	12 p. m.	53.0	54.3	45.5	42.5	30.27	0	N., light	None	10	10.3		Much	
14	6 a. m.	51.6	51.1	40.4	42.0	30.33	8	NW., light	None	10	9.4		Much	
	12 m.	57.9	59.0	50.2	44.5	30.34	4	W., light	None	10	9.0	180	Much	
	6 p. m.	62.4	69.2	55.4	45.0	30.29	4	S., light	None	10	8.5		Much	
	12 p. m.	41.8	60.2	41.8	45.0	30.29	10	S., light	Fog	10	8.0		Much	Foggy.
15	6 a. m.	39.4	42.4	38.4	47.0	30.24	10	SW., light	Fog	10	7.5		Little	Do.
	12 m.	49.8	50.6	39.0	44.6	30.11	10	NW., light	None	10	7.5	170	Little	
	6 p. m.	50.8	53.2	49.0	44.0	29.99	10	Calm	Light	10	7.0		Little	Showery.
	12 p. m.	49.0	52.0	47.5	44.0	29.98	10	Calm	Light	10	6.5		Little	Do.
16	6 a. m.	45.8	51.0	43.6	43.0	30.00	10	Calm	None	10	6.0		Little	
	12 m.	65.0	65.0	41.5	45.0	30.07	9	NW., light	None	10	5.5	166	Little	
	6 p. m.	58.5	66.3	50.9	43.0	30.08	9	Calm	None	10	5.0		Little	Warm.
	12 p. m.	50.2	58.5	50.2	44.0	30.14	10	Calm	None	10	4.5		Little	
17	6 a. m.	46.3	50.8	45.1	42.5	30.18	10	Calm	Fog	10	4.0		None	Foggy.
	12 m.	48.0		45.0	43.5	30.20	10	S., light	Mist	10	3.5	170	None	Disagreeable.
	6 p. m.	47.9		44.8	44.5	30.20	10	SSE., moderate	None	10	3.0		Little	Boisterous.
	12 p. m.	40.5		40.5	43.0	30.24	10	SSE., light	Mist	10	2.5		None	Misty.
18	6 a. m.	42.0		40.6	45.0	30.27	10	SSE., light	None	10	2.0		Little	Gloomy.
	12 m.	46.8		40.8	43.5	30.35	8	SSE., light	None	10	1.3	170	Little	
	6 p. m.	47.8		40.8	44.5	30.36	10	SSE., light	None	10	0.7		Little	Sun at times.
	12 p. m.	43.5		43.5	44.0	30.38	10	SSE., light	Light	10	0.3		None	Threatening.
19	6 a. m.	42.8		42.8	43.5	30.34	10	SSE., moderate	Moderate	10	0.0		None	Stormy.
	12 m.	48.2		41.7	43.0	30.27	10	SSE., moderate	Moderate	9	11.5	180	Little	Do.
	6 p. m.	47.0	51.3	46.5	43.0	30.27	10	SSE., light	Light	9	11.0		Little	Gloomy.
	12 p. m.	45.5	51.4	44.8	43.0	30.25	10	SSE., light	Light	9	10.5		None	Do.
20	6 a. m.	45.5	52.8	44.7	42.5	30.14	10	Calm	Mist	9	10.3		Little	Thick; misty.
	12 m.	49.5	53.0	44.7	42.5	30.09	10	SE., light	Mist	9	10.0	160	Increasing.	Do.
	6 p. m.	49.5	53.0	44.8	43.0	30.07	8	S., light	None	9	9.5		Moderate	Clearing.
	12 p. m.	48.3	53.7	47.2	43.0	30.08	10	SSW., moderate	Moderate	9	9.3		Moderate	Unsettled.
21	6 a. m.	46.5	51.7	44.3	43.5	30.06	10	SW., moderate	Heavy	9	9.0		Little	Boisterous.
	12 m.	46.0	50.0	42.2	44.0	30.03	6	SW., moderate	None	9	8.7	170	Little	Clearing.
	6 p. m.	51.2	66.7	42.0	45.5	30.01	3	SW., light	None	9	8.2		Moderate	Sunny.
	12 p. m.	48.0	66.8	45.7	44.5	30.04	9	Calm	None	9	8.0		Little	
22	6 a. m.	45.3	51.7	43.6	43.0	30.06	7	Calm	None	9	7.5		Little	Pleasant.
	12 m.	79.0	85.0	45.5	44.0	30.10	4	Calm	None	9	7.0	154	Moderate	Do.
	6 p. m.	62.8	84.8	43.5	46.5	30.12	1	Calm	None	9	6.5		Little	Do.
	12 p. m.	52.8	67.5	46.0	44.0	30.14	0	WSW., light	None	9	6.0		None	Bright moonlight.
23	6 a. m.	46.7	54.0	39.8	42.5	30.12	9	Calm	None	9	5.7		None	
	12 m.	59.0	68.6	47.3	46.0	30.14	1	W., light	None	9	5.2	150	Little	Pleasant.
	6 p. m.	68.0	80.3	56.5	47.0	30.18	8	W., light	None	9	4.7		Little	Do.
	12 p. m.	41.2	69.7	41.2	44.0	30.35	1	Calm	None	9	4.3		None	Do.
24	6 a. m.	41.1	44.2	38.0	44.5	30.41	10	Calm	Fog	9	4.0		None	Thick; foggy.
	12 m.	56.7	60.5	40.5	46.0	30.43	1	ESE., light	None	9	3.5	160	Little	Pleasant.
	6 p. m.	58.2	66.6	56.7	48.0	30.45	1	ESE., light	None	9	3.0		Little	Do.
	12 p. m.	41.5	60.8	41.5	46.5	30.52	1	SE., light	None	9	2.5		Little	Unsettled.
25	6 a. m.	41.0	44.7	39.8	45.5	30.55	10	SE., light	Fog	9	2.0		Little	Raw and foggy.
	12 m.	51.7	58.3	40.5	46.5	30.60	2	ENE., light	None	9	1.5	150	None	Pleasant.
	6 p. m.	54.8	61.7	51.4	47.5	30.57	1	ENE., light	None	9	1.0		None	Do.
	12 p. m.	41.7	58.4	41.7	46.0	30.63	10	ENE., light	None	9	0.5		None	Do.
26	6 a. m.	40.4	45.8	40.1	45.5	30.63	10	E., light	Fog	9	0.2		None	Foggy.
	12 m.	49.0	53.7	40.1	44.0	30.63	10	E., light	Mist	9	0.0	146	None	Misty.

RECORD OF METEOROLOGICAL OBSERVATIONS AT THE SALMON RACK AT LAKE ALEKNAGIK, ALASKA, DURING SEASON OF 1910—Continued.

Date.	Hour.	Temperatures. Air. At reading.	Temperatures. Air. Maximum.	Temperatures. Air. Minimum.	Temperatures. Lake at 6 feet depth.	Barometer reading.	Weather conditions. Clouds in sky (amount 1 to 10).	Weather conditions. Wind (force and direction).	Weather conditions. Rainfall (heavy, moderate, light, trace).	Lake conditions. Depth at rack-gate.	Lake conditions. Current at rack (per minute).	Lake conditions. Drift (much, little, none).	Remarks.
						Inches.				*Ft. in.*	*Feet.*		
July 26	6 p. m.	54.1	60.2	48.3	44.5	30.55	0	ESE., light	None	8 11.5		None	Pleasant.
	12 p. m.	41.8	60.0	41.8	44.0	30.58	4	E., light	None	8 11.0		None	Unsettled.
27	6 a. m.	42.0	45.7	40.5	44.0	30.56	10	E., light	Mist	8 10.5		None	Misty and raw.
	12 m.	52.5	56.7	41.8	44.5	30.55	4	E., light	None	8 10.0	144	None	Cloudy and cool.
	6 p. m.	57.2	63.6	52.0	46.0	30.51	1	ESE., light	None	8 9.5		None	Pleasant.
	12 p. m.	46.4	60.3	45.6	44.0	30.56	8	E., light	None	8 9.0		None	Cloudy and cool.
28	6 a. m.	44.3	49.8	43.3	43.0	30.55	10	Calm	None	8 8.5		None	Overcast.
	12 m.	60.3	75.1	44.3	45.0	30.55	9	S., light	None	8 8.3	150	Little	Pleasant.
	6 p. m.	56.8	75.0	56.4	44.5	30.50	9	S., light	None	8 8.0		None	Do.
	12 p. m.	46.9	59.2	46.9	44.0	30.51	10	S., light	None	8 7.5		None	Overcast.
29	6 a. m.	44.7	50.7	44.2	44.0	30.43	10	Calm	Light	8 7.0		Little	Rainy.
	12 m.	83.0	85.6	44.2	46.0	30.44	2	Calm	None	8 6.8	160	Little	Pleasant.
	6 p. m.	59.6	86.8	58.7	46.0	30.44	1	SW., light	None	8 6.5		None	Do.
	12 p. m.	43.0	64.0	43.0	43.0	30.49	0	Calm	None	8 6.0		None	Do.
30	6 a. m.	40.8	47.6	38.4	44.0	30.44	5	Calm	None	8 5.5		None	Unsettled.
	12 m.	41.4	49.5	40.8	46.0	30.31	10	SSE., moderate	Light	8 5.0	150	Little	Stormy.
	6 p. m.	47.3	51.1	40.3	46.5	30.18	10	Calm	Mist	8 4.8		Little	Misty.
	12 p. m.	44.4	50.7	42.4	45.5	30.28	0	Calm	None	8 4.5		None	Pleasant.
31	6 a. m.	47.7	50.8	40.0	46.0	30.35	2	W., light	None	8 4.0		Little	Do.
	12 m.	52.6	69.8	47.8	47.5	30.32	10	SSE., light	None	8 3.5	140	Little	Unsettled.
	6 p. m.	48.8	57.9	44.8	48.0	30.15	10	S., light	Moderate	8 3.0		Little	Stormy and cold.
	12 p. m.	43.2	48.0	43.2	47.5	30.03	10	Calm	Light	8 2.5		None	Unsettled.
Aug. 1	6 a. m.	44.5	47.8	43.0	48.0	29.96	10	WSW., light	Heavy	8 2.3		Little	Stormy.
	12 m.	56.1	64.7	44.1	48.5	30.10	10	Calm	None	8 3.0	130	Little	Unsettled.
	6 p. m.	54.5	72.4	53.8	49.0	30.10	10	SSE., light	None	8 2.3		None	Do.
	12 p. m.	42.0	57.4	42.0	48.5	30.08	10	NE., moderate	Light	8 2.0		None	Stormy.
2	6 a. m.	44.7	47.8	41.7	48.5	29.78	10	SSE., moderate	Heavy	8 2.0		Little	Do.
	12 m.	44.2	50.1	44.0	48.0	29.81	10	SSE., moderate	Light	8 2.0	100	Little	Do.
	6 p. m.	43.0	50.3	42.8	47.0	29.83	10	SSE., moderate	Light	8 1.5		None	Do.
	12 p. m.	41.5	46.0	41.5	47.0	29.85	10	SSE., light	Trace	8 1.3		None	Boisterous.
3	6 a. m.	42.3	46.4	40.5	47.0	29.75	10	Calm	None	8 1.0		None	Moderating.
	12 m.	50.0	53.5	42.5	48.0	29.78	9	SW., light	None	(Demolition of rack commenced.)			Unsettled.
	6 p. m.	49.2	54.6	48.8	47.0	29.84	8	SW., light	Trace				Do.
	12 p. m.	42.0	52.2	42.0	44.0	29.97	10	Calm	None				Do.

SIGNIFICANCE OF WOOD RIVER DATA.

The spawning run up Wood River again shows a loss in comparison with the preceding season. The total was 670,000 in 1910, as against 893,000 in 1909. The commercial catch of Nushagak Bay also fell off, being 4,400,000 in 1910 as against 4,900,000 in 1909. The Wood River run in 1910 was 75 per cent of the 1909 run; the Nushagak Bay catch in 1910 was 89.8 per cent of the 1909 catch. Thus in each of these years the Wood River spawning run has declined much more rapidly than the catch in the bay has declined. The following table shows the numerical results in round numbers for the three years of Wood River investigations. The last column gives the sum of the bay catch and the Wood River run, this total constituting far the greater part of the whole run into Nushagak Bay.

SPAWNING RUN IN WOOD RIVER, 1908, 1909, AND 1910.

Years.	Nushagak Bay catch.	Wood River tally.	Total.
1908	6,400,000	2,600,000	9,000,000
1909	4,900,000	893,000	5,793,000
1910	4,400,000	670,000	5,070,000

The commercial catch for the whole bay has fallen off since 1908 by two annual losses of $1\frac{1}{2}$ millions and $\frac{1}{2}$ million, respectively. The corresponding loss to the Wood River tally was in 1909 numerically even greater than the loss on the catch, while in both 1909 and 1910 the percentage loss in Wood River was greater than on the catch.

According to observations in the river and the head of the bay, and the reports of the packers, the run up the main river was unusually large this season, evidently greater than the Wood River run. By taking the latter as a minimum and twice the number as a maximum for the main river run, and estimating otherwise on the same basis as in previous seasons, about 6,400,000 is obtained as the estimated run for the whole bay in 1910, which in view of the maximum error probable may be accepted as within one-half million of the actual run. Of this estimate over 79 per cent, or more than 5 million fish, are fish actually counted in Wood River by the observers and in Nushagak by the commercial fishermen.

The total escape to the spawning grounds for the whole Nushagak region during the current season lies between 25 per cent and 36 per cent of the total run, with 31 per cent probable. In other words, the industry took between 64 per cent and 75 per cent of the whole run, and probably took about 69 per cent.

As bearing on the rate of increase the figures for the season corroborate broadly the conclusions reached the year previously and tend

to narrow the limits between which this rate is indicated to lie. From such a slender basis of facts as are available, a rate of increase of from 200 per cent to 250 per cent is to be inferred if there is neither under nor overfishing. If these figures are too high the Nushagak industry is overfishing. If they are too low, fish are being uselessly wasted to the spawning grounds. The latter of these alternatives would hardly be maintained by anyone, and can hardly hold over a course of years, yet it may possibly be true of an occasional season, such as that of 1908.

Value of a census of salmon runs.—If the establishment of the increment percentage, rate of increase, or measure of the tendency of red salmon to multiply by their own natural and unaided reproductive powers is of any importance to the fisheries, then the Wood River investigations or their counterpart ought to be continued and made to include a complete salmon catchment basin, the larger and more isolated the better. It can hardly be maintained that the factors of temperature, wind, chance, etc., affect so erratically the movements of the great schools that the annual run to a given basin is little or not at all related to the preceding spawning runs which escaped capture therein. Salmon of course do not all return to the region where they were hatched. Some go elsewhere and a continuous flux or ebb and flow of interchange results.

But the number of the spawners inevitably measures the reproductivity. If this number could be ascertained for all Alaska, it would soon be known how prolific the salmon are. Since this is impossible it remains to make the determination on as large a section of the spawning grounds as can be handled. A somewhat longer time is required in order that the annual variations affecting the particular fragment of the fishery under observation shall reach an average making it representative of the whole. It matters little whether the adult salmon return to their parent waters, or whether they interchange freely, even to the extent of none returning to their birthplaces. The essential point is to determine how large are the runs which succeed year after year to a series of known spawning escapes.

As a matter of fact, there is much difference of opinion among fishermen respecting the controlling effect of winds on the movements of salmon. In Bering Sea few days pass without strong blows, and it is easy to relate the suddenly arriving salmon run to some particular wind, just as the so-called equinoctial storm is supposed to have some essential connection with the autumnal equinox. But whatever resultant physical influences have, they do not prevent an unfailing annual rush of hordes of red salmon into Nushagak Bay, their advent predictable almost to the day and their numbers expected with perfect certainty to be measured in millions. During the countless years in which this has occurred before the commercial fishery

existed the uniformity was presumably greater than at present. The variations in size of the run known to have occurred since man disturbed the balance of nature in these fisheries are reasonably due mainly to the exigencies of the commercial industry, which has been unable to make any correlation between its take and the quota necessary for spawning. Even with these variations, no such thing as a failure in the run is known to history or tradition. Even at the lowest ebbs of the commercial fishery the salmon had still to be counted by millions. As fisheries go, the Nushagak region and most of the Bristol Bay streams are constant and perennial sources of salmon.

That the determination of the rate of increase of red salmon, or the limits within which it varies, is a matter of high importance is self-evident. Of course a high rate has already been implied by the great productivity of salmon fisheries and their failure in Alaska to deplete rapidly under enormous drains. Presumably it has been known to many that the fishermen have been, in many fisheries, taking almost every year more than half the run. The lesser portion must therefore have reproduced the whole run, which placed the annual increment at over 100 per cent. Just how small this escaping portion may be and still reproduce a maximum run has been and is yet the vital and crucial question. But three long steps in answer have been taken by the three years of Wood River investigations.

There is no other way to obtain this increment percentage than by continued counting of the breeders, which, with the commercial catch, amounts to a census of the run. The three annual counts already made in Wood River, coupled with general knowledge of the other rivers of the bay, already show roughly what proportion of the Nushagak Bay run has reached the spawning grounds in these years, and since the Bering Sea fisheries are not rapidly declining this is probably not much below the proportion which should reach the spawning grounds.

This showing is definite enough to be safely used in a practical way as a basis for dividing the whole run into a commercial and a breeding quota. At the beginning the tentative figures might be 70 per cent for the former and 30 per cent for the latter. Seventy per cent is not far from representing the proportion of the run the industry has been taking from Nushagak Bay in each of the past two years. By the use of racks in the rivers the run could be divided as it came into alternate daily portions, one to escape, the other for the packers. Thus a definite proportion of the run would be insured to the spawning grounds, and the actual number of fish of which it consisted would be known. Even if a considerable inaccuracy existed in the tentative fixing of 30 per cent for the breeding quota, no injury would result, for the annual counts would constantly

correct the figures. It is only necessary to begin such a system of catching and releasing at proportions just to the industry and reasonably safe for the fisheries. It may be assumed for this purpose that a 30 per cent escape will approximately maintain the Nushagak fisheries. This implies a rate of increase of 233 per cent, which means that for three salmon which reach the spawning grounds, spawn, and die, ten adult salmon return during the next few years, and that if no more than seven of these are taken by the fishermen the process can continue indefinitely.

The Pacific salmon, and particularly the red salmon, alone among commercial fishes, are surprisingly adapted to the control of man for the purpose of perpetuation and exploitation as a commercial asset. They leave the sea regularly at a certain season and make their way en masse to the narrow channels of the fresh and more or less clear waters, where they may be confined, held, captured, or counted and released to the spawning grounds without injury—all with comparative ease and convenience. Spawning is definitely confined to the single season of sexual maturity and is soon followed by the death of the adult, so that breeding salmon never themselves become a part of subsequent runs. These facts make it possible not only to measure their reproductive power, but to put into effect a system of fishing whereby from a minimum reservation of breeding salmon the fishery may be maintained perpetually at a maximum. At the same time the industry may obtain its fish for packing easily and cheaply. The pack may be made in a perfectly fresh condition. The canneries can operate uniformly throughout the season, instead of with the present alternations of scarcity and abundance. Runs of more uniform size would finally succeed upon a more uniform release of breeders, and would therefore be more accurately predictable.

There is a certain quantity of seed represented by spawning salmon, a more or less definite fraction of the whole run, varying within presumably narrow limits, which nicely produces without waste from the spawning fields and the feeding grounds of the seas a maximum crop of fish. Any greater quantity is an excess, being a total waste of nonproductive seed, while any lesser quantity is a more serious loss, the waste of a multiplied return from potential seed which should have been used as such. No system of fishing can possibly make this measured sowing of the spawning grounds without actually counting the whole run. This the present system does not do. It counts the catch alone, and therefore it almost always wastes fish, either as nonproductive breeders or as the multiplied (by about $2\frac{1}{3}$) return from fish which should have been allowed to breed. The tendency is toward the latter or greater loss. Only occasionally and by chance will both forms of waste be avoided.

These opportunities which the peculiar specialized habits of the red salmon afford for perpetually exploiting them commercially without depleting their abundance should be utilized. The packing industry would greatly profit in the end and the Alaska fisheries would enhance in value as a national asset. At present the law does not provide power to establish such a system of fishing, but it would permit a trial in a suitable region by mutual agreement between the packers concerned and Federal authority.

EXPLORATIONS OF LAKE ALEKNAGIK.

During the summers of 1908 and 1909 every stream tributary to Lake Aleknagik, which gives rise to Wood River, was examined by the agent. During the current summer Mr. W. T. Bower, of the Division of Fish Culture of the Bureau, spent the period from July 17 to July 27 in explorations of the lake and streams. By means of these observations the streams have been thoroughly prospected with reference to spawning salmon and hatchery possibilities. Two suitable and feasible hatchery sites have been selected, and on either a properly equipped expedition, arriving as soon as navigation opened, could erect a hatchery in time to obtain a portion at least of the same season's spawn.

Such a hatchery could be located on the lake shore and be accessible directly from tidewater for light-draft boats. No single stream of the lake would afford eggs enough to fill a large hatchery, and collections would have to be made over the whole lake in some seasons. There is, however, no more suitable location in the Bristol Bay region for accessibility and proximity to large spawning grounds. The second lake could be drawn upon for eggs if necessary. There is no hatchery in western Alaska, a region which furnishes some 63 per cent of the total pack of Alaska red.

THE COD FISHERY.

All but one of the firms and individuals [John H. Nelson, of Squaw Harbor] operating in the district for cod exclusively have their headquarters at San Francisco, Cal., or Seattle, Anacortes, or Tacoma, Wash., at which places, or in their immediate vicinity, the cured fish are received and prepared for marketing. About half of the operators have shore stations located at favorable places in central Alaska, on the Shumagin and Sannak Islands, and Unimak Island. From thence the dory fishermen carry on their operations, bringing in their catch daily, and when they have accumulated enough to form a cargo a vessel is dispatched from the home port or else a fishing vessel completes its fare from the station catch and carries the fish to the curing establishments in the States.

The industry has suffered severely in the past from the spreading broadcast of exaggerated ideas as to its possible profits. As a result of this persons totally unfamiliar with the work have engaged in it, and instead of building up a trade by the preparation of a good product at a living price have prepared goods in a slipshod manner and then disposed of them by cutting below the prices of more reputable dealers.

When the present season opened the trade was in a demoralized condition, owing to excessive cutting of prices. During the summer certain changes in ownership took place. A new company, the Western Codfish Co., took over the plants, vessels, etc., of King & Winge Co. and the Seattle-Alaska Fish Co. The Union Fish Co., of San Francisco, bought and had delivered to it the catches of the vessels owned and operated this year by the Robinson Fisheries Co., of Anacortes, Wash., and the Blom Codfish Co., of Tacoma, Wash.

Through this centralizing of the industry, price cutting was eliminated, temporarily at least, and when this report closed the market was in excellent condition. A considerable surplus is on hand, but the dealers are content to hold this for their own price, which, owing to the shortage of cod on the Atlantic coast, they are reasonably sure of getting.

Mr. J. A. Matheson, of Anacortes, Wash., has incorporated his plant, and it is now known as the Matheson Fisheries Co. The Pacific States Trading Co., of San Francisco, which did not operate this year, will probably resume operations in 1911.

The winter of 1909–10 was severe, and the cod fishermen were very much hampered as a result. Up to June 1 heavy winds prevailed, and after that, while winds were light, heavy fogs were frequent. Owing to the severe weather practically no fish were caught in Dublin Bay.

On March 28 the codfish schooner *Stanley*, owned by the Union Fish Co., of San Francisco, Cal., when approaching Pavlof Harbor, on Sannak Islands, in central Alaska, grounded on a reef and immediately began to go to pieces. In the heavy seas continually breaking over her one man was washed overboard and drowned and three men, including the master, died from exposure before rescuing parties from the shore could reach the ship. The rest of the crew, five men, were saved. The vessel was carrying supplies to the company's shore stations in Alaska, and her loss seriously hampered the operation of these for several months.

SHORE STATIONS.

During 1910 the following shore stations were operated: Alaska Codfish Co.: Unga, Baralof (Squaw Harbor), and Kelleys Rock (Winchester), on Unga Island; and Companys Harbor and Moffats Cove,

on Sannak Island. John H. Nelson: Squaw Harbor, Unga Island. Union Fish Co.: Pirate Cove, Popof Island; Northwest Harbor, Little Koniuji Island; Pavlof Harbor and Johnson Harbor, on Sannak Island; Sanborn Harbor, on Nagai Island; and Unga, on Unga Island. Several which were shut down this year will be operated in 1911.

STATISTICS FOR CENTRAL ALASKA.

During the year 197 fishermen, 22 shoresmen, and 37 transporters were employed. The total investment amounted to $162,655. The catch amounted to 3,019,023 pounds of fish as taken from the water. When cured this weighed 2,269,914 pounds and sold for $63,443, a very large decrease from 1909.

Persons Engaged in the Central Alaska Cod Fisheries in 1910.

Occupation and race.	Number.
Fishermen (shore fisheries):	
Whites	197
Shoresmen:	
Whites	18
Indians	3
Chinese	1
Total	22
Transporters:	
Whites	37
Grand total	256

Investment in the Central Alaska Cod Fisheries in 1910.

Items.	Number.	Value.	Items.	Number.	Value.
Transporting vessels:			Boats, sail and row	197	$5,950
Steamers and launches	3	$28,000	Apparatus: Hand lines		1,205
Tonnage	78		Cash capital		45,000
Outfit		3,500	Stations, with accessory property		39,500
Sailing	2	37,500			
Tonnage	235				
Outfit		2,000	Total		162,655

Products of the Central Alaska Cod Fisheries in 1910.

Products.	Round weight.	Dressed weight.	Value.
	Pounds.	*Pounds.*	
Cod, fresh	16,000	14,000	$560
Cod, salted	2,877,157	2,157,914	59,433
Cod, pickled	125,866	94,400	3,320
Cod tongues, salted		3,600	130
Total	3,019,023	2,269,914	63,443

VESSEL FISHING.

The following fleet[a] of 11 vessels, with headquarters in California and Washington, operated in Alaskan waters this year, several of them spending the winter of 1909–10 in the north.

COD-FISHING FLEET IN ALASKAN WATERS, WINTER OF 1909–10.

Name.	Class.	Net tonnage.	Owner.
Fanny Dutard	Schooner	252	Matheson Fisheries Co., Anacortes, Wash.
Alice	do	220	Robinson Fisheries Co., Anacortes, Wash.
Joseph Russ	do	235	Do.
Maid of Orleans	do	171	Seattle-Alaska Fish Co., Seattle, Wash.
Vega	do	233	King & Winge Codfish Co., Seattle, Wash.
Fortuna	do	138	Blom Codfish Co., Tacoma, Wash.
W. H. Dimond	do	376	Alaska Codfish Co., San Francisco, Cal.
City of Papeete	Barkentine	370	Do.
John D. Spreckles	Schooner	253	Do.
Fremont	do	328	Union Fish Co., San Francisco, Cal.
Stanley[a]	do	253	Do.

[a] Lost at sea.

The vessels from Washington operating in Alaskan waters caught 911,500 fish, with a cured weight of 3,563,000 pounds, which sold for $97,983, while those from California caught 498,399 fish, with a cured weight of 1,992,000 pounds, valued at $54,780.

THE HALIBUT FISHERY.

FISHING GROUNDS.

The fishery for this very choice food fish occupies second place in the commercial fisheries of Alaska. At present the industry is practically restricted to southeast Alaska, the few fish taken in central Alaska being consumed in the towns in that section. This is due almost wholly to the fact that the present steamship facilities to this section of Alaska are inadequate for the handling of this species as expeditiously as is required. Halibut are reported from various places in Cook Inlet, from all along the Alaska Peninsula and the adjacent islands, and in Prince William Sound.

In western Alaska the fish is reported from a number of places, the natives usually catching and using it for food. The natives of the Pribilof Islands, when fishing off the islands, catch numbers of halibut and these are usually very choice specimens.

In southeast Alaska halibut appear to be most abundant in the numerous sounds and straits during the winter months. Icy, Chatham, Peril, and Sumner Straits, and Frederick Sound are the chief centers of abundance. The best grounds are to be found in Frederick Sound, especially around the Five Finger Islands. Good banks are to be found scattered all over Icy Straits. The waters of

[a] None of the data relating to this fleet appear in the statistical tables.

Chatham Strait are too deep for general fishing, but off Point Gardiner and at several spots off Baranof Island, are to be found good fishing banks, while Kootznahoo Inlet, on Admiralty Island, yields good fishing in summer. In Sumner Strait are to be found very good deep-water winter fishing grounds. During the winter of 1909–10 some of the fishermen fished here in water as deep as 250 fathoms. The vicinity of the Eye Opener is the best ground to be found in the strait. Indians fish considerably in Boca de Quadra and the vicinity of Kah Shakes Cove, Mary's Island, and the mouths of Kasaan Bay and Cholmondeley Sound. In Stephens Passage considerable fishing is done in and just off the mouth of Seymour Canal. Most of the fishing in the protected waters of southeast Alaska has heretofore been done in winter, as the fish were then most abundant and the prices realized were better than in summer when the Puget Sound fleet operates on the Flattery Banks, off the Washington coast, and brings the fish in in such abundance that the Alaska-caught fish, which have to be shipped on the steamers plying between Seattle and southeast Alaska ports, at considerable expense, can not compete. This summer, however, the New England Fish Co. bought and froze all halibut brought to its Ketchikan plant and as a result a number of fishermen continued halibut fishing throughout the year.

For many years the Puget Sound steamers and large power vessels fished in Hecate Strait and off the chain of islands lying outside the British Columbia mainland. During the last few years these banks have been growing less and less productive, and as the Canadian fishery protection boats have very much harassed our fishermen who were operating in these waters, or who were driven into its harbors by stress of weather or for wood and water, they have been gradually extending their operations northward into Alaska waters, where they would be free from molestation. It has been known for some years that halibut were abundant at certain regions in the ocean off the outer fringe of islands in southeast Alaska, more particularly off Baranof Island and the mainland between Cape Spencer and Yakutat Bay, and it was surmised that other and possibly more extensive banks would be found if looked for. During the winter of 1909–10 several of the vessels prospected the open waters between Cape Muzon and Sitka, with the result that halibut were found in great abundance throughout the greater part of this area. Off Forrester Island seemed to be the center of greatest abundance. Here an average depth of 80 fathoms is found for about 4 miles from shore; a little farther out it deepens to 150 fathoms. The first few cargoes from here averaged 15 pounds to the fish, but the average soon dropped to 14 pounds. One steamer early in July caught about 250,000 pounds of halibut on the Forrester Island banks during one trip.

Halibut frequent the sandy banks on which coral and a small shellfish known to the fishermen as "sea cocks" abound. The latter is sought by the halibut as a choice morsel of food. The fish is a very voracious and promiscuous feeder. The stomach of one opened at the Ketchikan plant of the New England Fish Co. contained an octopus, a crab, a salmon, and a dogfish. Sand launce and fish eggs of a large size appear to be its favorite food at certain seasons. One dealer reports finding a 6-inch section of a tree branch in the stomach of one. The fishermen say that frequently when pulling up a hooked halibut, other halibut will follow the hooked one to the surface, biting at its tail and body.

A few female halibut with roe reach the dealers, but the fish are usually dressed on the banks, and the roe, when present, is thrown away. Several fish with roe were received by the New England Co. in August and September.

METHODS AND CONDITIONS.

Within the protected area in summer the fish are scattered considerably, but during the winter they school on banks in the waters noted above. During this season the greater part of the year's catch is made by the smaller vessels, which are unable to stand the rough weather usually encountered on the banks in the open ocean.

Dealers located at Hoonah, Juneau, Douglas, Scow Bay, Petersburg, Wrangell, and Ketchikan handle the fish from the fishing boats. Scow Bay, which is on Wrangell Narrows, about 5 miles from its head, is the principal shipping point. Here are moored several large house scows, floats, and barges, alongside of which the fishing boats tie up and deliver their catch, to be boxed in ice for shipment and put aboard the regular steamers for Seattle, which pass through the narrows every few days. The fish are cleaned and packed in ice in bins aboard the vessel on the banks. The fishermen furnish their own ice, which is frequently secured from icebergs which have broken off from nearby glaciers and are floating around in the bays, sounds, and straits. The dealer furnishes the shooks for making the boxes, which hold about 500 pounds. Where glacier ice is not available the fishermen buy from the artificial ice plants, paying from $3 to $5 per ton.

A few years ago halibut weighing over 50 pounds were usually fletched aboard the vessel, but the demand for fletched halibut is so small, and the price realized is so inadequate to the work involved, that but few are now prepared in this manner, and these usually on shore. In fletching the sides are taken off in two complete pieces, which are then put into bins and buried in salt so that the brine will run off. It usually requires about three weeks for the fish to strike properly. Half-ground California salt is used in curing.

In shipping fresh, the best fish are from 25 to 30 pounds in weight. A 10-pound fish is quite a small one. Those smaller are known as "chickens." Most of the Alaska halibut are of good grade. But few logy halibut are found; that is, with watery flesh which clings to the knife when cut and does not have the blue tint of the first-class fish.

Sometimes the dealer makes a contract with a vessel owner at a certain fixed figure, but when the fish are received on consignment the commission charged is generally 5 per cent. The dealers usually purchase outright, at the current rates, the fish landed by the small boats.

Large halibut are occasionally taken, one being delivered at Juneau in 1904 which weighed 365 pounds. According to the fishermen the females appear to have well developed eggs at any season of the year.

Shooks for making a halibut box cost from 65 to 70 cents for each box, depending upon the quantity ordered. The only other expense is for nails and the labor required in making the box. The fishermen deliver the halibut at the scows in an eviscerated condition. When being packed for shipment the head is removed and the fish thrown into the box with the tail toward the middle. Under ordinary conditions 1 ton of ice is required for 6 tons of fish, which is quite reasonable when it is taken into consideration that the fish must be carried a distance of over 700 miles by steamer. The freight rate to Seattle varies from $7 to $7.50 per cubic ton, depending upon the distance of the shipping point from Seattle. For shipments of less than 6 boxes the rate is somewhat higher. In addition wharfage has to be paid in Alaska (usually about $1 per ton) and in Seattle (40 cents per ton). Six boxes of fish are considered to weigh 2½ tons.

The greater portion of the Pacific coast halibut is shipped to points east of the Mississippi River, Chicago, New York, and Boston being the principal distributing centers. The demand from the Pacific coast and adjacent States, however, is showing a healthy growth, and will eventually absorb the greater part of the catch.

Heretofore the vessels of the New England Fish Co. have operated from the company's plant in Vancouver, British Columbia, the fish landed from the vessels with American register having been shipped through to places in the United States in bond, free of duty. Since the establishment of the company's station at Ketchikan these steamers have virtually made this place their headquarters and have been so credited in this year's report.

On December 29, 1909 (too late to be included in the report for that year), as the gasoline schooner *Capella* was being towed from Wrangell to Petersburg by the gasoline boat *Neptune*, the latter broke down and both vessels drifted onto the northeast shore of

Vanks Island. The *Capella* became a total wreck, and her master and a sailor lost their lives from exposure and exhaustion after reaching land.

On November 13 the gasoline schooner *Sea Light*, of Ketchikan, while on a halibut fishing cruise, was wrecked at Larch Bay, near Cape Ommaney, in southeast Alaska, during a severe gale. After suffering much hardship the crew of 8 men managed to reach safety in their dories. Later the vessel was found on the beach by another fishing vessel which worked her off and towed her into Petersburg.

STATISTICS.

During the year 1910 there were 829 persons employed in all branches of the halibut industry. The number of steamers and launches increased enormously over 1909, because of the highly remunerative prices realized for halibut the previous year. The catch as reported in 1910 amounted to 21,579,289 pounds, valued at $808,010, as compared with 5,189,924 pounds, valued at $195,529 in 1909. Part of this great increase in showing is due to the changing of the headquarters of the New England Co.'s fleet of steamers from Vancouver, British Columbia, to Ketchikan, thus bringing them within the scope of this report.

PERSONS ENGAGED IN THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1910.

Occupation and race.	Number.	Occupation and race.	Number.
Fishermen:		Shoresmen:	
Vessel fisheries—		Whites	29
Whites	343	Indians	2
Indians	34	Total	31
Total	377	Transporters:	
Shore fisheries—		Whites	1
Whites	240	Grand total	829
Indians	180		
Total	420		

INVESTMENT IN THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1910.

Items.	Number.	Value.	Items.	Number.	Value.
Fishing vessels:			Scows	5	$7,600
Steamers and launches	66	$468,800	Apparatus:		
Tonnage	842		Vessel fisheries, trawl lines		22,080
Outfit		165,049	Shore fisheries, trawl lines		15,870
Sailing	3	3,800	Cash capital		52,500
Tonnage	35		Shore and accessory property		252,200
Outfit		875	Total		1,258,004
Packing barges	1	15,000			
Tonnage	338				
Launches under 5 tons	151	a 253,330			
Boats, sail and row	20	600			

a Outfit included.

PRODUCTS OF THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1910.

Products.	Round weights.	Dressed weights.	Value.
Vessel catch:	*Pounds.*	*Pounds.*	
Halibut, fresh	18,251,519	14,601,215	$702,245
Halibut, frozen	2,343,644	1,876,915	69,871
Halibut, fletched	66,560	49,920	2,259
Total	20,661,723	16,528,050	774,375
Shore catch:			
Halibut, fresh	786,482	645,186	29,669
Halibut, frozen	123,481	98,785	3,677
Halibut, fletched	7,333	5,500	275
Halibut, pickled	270	200	14
Total	917,566	749,671	33,635
Grand total	21,579,289	17,277,721	808,010

In Central Alaska 51,000 pounds, valued at $2,040, was marketed in addition to above.

PUGET SOUND FISHING FLEET.

A fleet of Puget Sound power vessels visits southeast Alaska during the months from October to March, when, owing to stormy weather and a scarcity of fish, it is not safe nor profitable to visit the banks near the home ports. This fleet makes its headquarters mainly at Petersburg, at the head of Wrangell Narrows, shipping the catch home from Scow Bay, near by, via the regular steamship lines. A few rendezvous at Ketchikan and Juneau. This fleet was composed of 60 vessels, valued at $782,230, employed 1,800 men, and used trawls valued at $70,850. As a result of its operations in Alaska the fleet (with the exception of the steamers) caught and shipped 3,531,644 dressed pounds (the round weight of this catch or the weight of the fishes taken from the water was approximately 4,414,555 pounds), valued at $158,260. The steamers carry their own catches to the Sound ports and these have not been included in the above amount. During the summer months most of this fleet fishes on the Flattery Banks off the State of Washington, or else off the British Columbia coast.

THE HERRING FISHERY.

ABUNDANCE OF FISH.

At times herring are quite abundant along the coasts of southeast, central, and western Alaska. At Captains Harbor, on Unalaska Island, they appear twice each year, in July and September. Residents of Port Heiden, in Bering Sea, report that large schools visit that bay in the spring and fall, and there is said to be a large annual run at Atka Island. Herring are quite abundant in Port Clarence also, and some fishermen located at Grantley Harbor, near the head of

this bay, have been salting on a small scale during the past three or four years and selling the fish at Nome and the various settlements in that section of Alaska. The schools generally visit Cook Inlet, in central Alaska, from July to October, and these fish are the largest and finest found in Alaskan waters. In southeast Alaska herring are found in varying abundance in almost every bay, strait, and sound.

According to the best information obtainable, the herring in southeast Alaska begin to spawn during April or May and continue in some localities as late as July 1. Immediately after spawning the fish school in great abundance out in deep water, especially in Frederick Sound and the southern end of Stephens Passage, and then reenter the bays for the purpose of feeding. During July and August they are filled with red feed (certain species of small crustaceans) which makes them very difficult to cure. In September and October apparently they change their food, for the red feed is not then noticeable in their stomachs, and at this time they are in their prime. The runs are usually composed of mixed sizes, although in early summer there are said to be numerous bays where all the herring will be of small size. In western Alaska, according to Nelson, the herring spawn in the neighborhood of St. Michael in June.

> At this time these fish form a continuous line along the beach, passing from south to north in unbroken succession, spawning on the seaweeds and rocks from above low-tide mark to a fathom below it. They enter all the inner bays and swarm about every reef and rocky point. The water boils with them along shore as they struggle about in a dense mass among the short seaweed in spawning, and they can be easily caught in one's hands. The females move slowly among the weeds, and press in the midst of them, depositing their eggs, which adhere to whatever they come in contact with, by means of a gummy secretion with which they are coated. Thrusting my hand under water for a half minute was sufficient for it to be covered with eggs.[a]

In southeast Alaska during the spawning season, the natives place spruce boughs in the water, and after the eggs have adhered, remove the boughs and dry the eggs in the sun, using them later as food. In this way many thousands of eggs are destroyed each season. This practice should be prohibited by law.

USES FOR FOOD AND BAIT.

Unfortunately, but little commercial use is made of herring as a food fish in central, western, and arctic Alaska. In 1907 a herring saltery was established on Simeonof Island, one of the Shumagin group, in central Alaska. Owing to the low prices realized for the prepared product, and the high cost of transportation, the plant was closed down in 1908 and 1909, but it was reopened this year. A small quantity is marketed fresh, but the great bulk of the catch is made by the Indians, who consume the fish, either fresh or after being dried.

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[a] Report upon Natural History Collections made in Alaska between the years 1877 and 1881, by Edward W. Nelson, p. 320-21 (1887).

In southeast Alaska the fishery has attained to considerable prominence. Here herring are sold fresh and salted for food; but the principal use is as bait in the halibut and king salmon fisheries and as fertilizer and oil. In baiting, fresh herring are used whenever possible; but when the fisherman has to hold them for a few days the herring are usually dumped round into a barrel with enough salt to preserve them until needed. There is also a demand from the States for the larger herring for smoking purposes, and each season a few dressed and rolled in salt are packed in halibut boxes holding about 500 pounds, and shipped.

Several inquiries were received this year from Seattle and San Francisco brokers and commission men in regard to supplying salted herring for the China trade, and it is to be hoped that some business in this line will eventuate.

Each season there are many complaints from the halibut fishermen as to the scarcity of herring and the heavy loss sustained through the boats being tied up for days at a time owing to the lack of bait. The question of a constant and abundant supply of bait is, in fact, the most serious problem confronting the halibut fishermen. During the summer months halibut fishing is carried on in a desultory manner; but about the middle of September the fleet from Puget Sound arrives, and this, joined with the local fleets, soon causes a tremendous demand for herring, which is the only bait used in the fishery to any extent. The matter is still further complicated by the erratic behavior of the herring itself, which may appear in countless numbers in a certain bay one year, while the next year there may not be one.

The most feasible method for overcoming this handicap would be by the establishment of small freezers at Wrangell, Scow Bay or Petersburg, Juneau, and Hoonah, where herring could be received from the fishermen during the summer and early fall, when most abundant, and frozen and stored away until needed in the late fall and winter. The New England Fish Co., at its Ketchikan plant, freezes a large quantity of herring each year, which it supplies to its own steamers and to the smaller vessels which deliver their catches of halibut at its plant.

THE FERTILIZER QUESTION.

The use of herring in the manufacture of fertilizer and oil as conflicting with its use by man directly as a food and bait fish, and indirectly through the dependence of the valuable king salmon fishery upon it as food material, gives rise to a somewhat puzzling question of right and administrative policy. The present fisheries law does

not prohibit such use of food fishes, and there is now one plant—that of the Alaska Oil & Guano Co., at Killisnoo, in southeast Alaska—engaged in the industry. This year this plant caught 59,000 barrels of herring, with an aggregate weight, roughly, of 11,800,000 pounds. Of these all but 130 barrels, which were pickled for use as bait, were converted into fertilizer and oil.

It is easy to conceive of commercial uses to which fishes are put which take precedence over other uses with respect to public advantage. Thus the manufacture of fertilizer and oil from fishes is a lower use, inferior to the business of preparing food products from fishes, or even to their use as bait for food fishes. Thus the menhaden ranks lower than the herring. Such a view in part grows out of the fact that these fertilizer and oil products, quite legitimate in themselves, do not depend entirely on fishes for their raw material. Furthermore even fish fertilizer and fish oil do not depend upon the herring, for various nonedible fishes, as the menhaden, are available. The general view of a higher use denoted by the appropriation of fishes for human food has widely obtained and is evidenced by various legislation prohibiting the lower use where it has conflicted with the higher. The dependence of a highly prized food fish and a correspondingly valuable fishery upon another fish as food for the former, as in the case of the king salmon upon the herring, may be classed with the higher uses. This in fact is one of the most important aspects of the value of the herring fishery, if not its chief use. An important food of the king salmon is herring, and as the catching of king salmon by trolling now forms one of the most important and profitable of the fisheries of southeast Alaska, no condition that adversely affects it in a material degree should exist unless by the justification of a paramount right and importance.

In the absence of a material higher use the manufacture of the lower products is to be commended, in so far as it causes no depletion, as making a legitimate use of fishes which would otherwise go to waste. Certainly were there no other demand for the herring, such a use should be encouraged. The king salmon of course makes a continual demand upon it, and the king salmon fishery is a permanent one. Even the satisfaction of this demand might perhaps leave a margin of the natural increase of herring for other uses.

Other things being equal it is of course the operation of the law of supply and demand which will determine what use shall be made of commercial fishes, the product being prepared for sale in the highest market. Under such circumstances the matter of use might be left to competition which would exploit the fishery for its most profitable end. Perhaps no such legitimate use could be regarded as indefensible, though lower from some standpoints, but without

discussing this question it may suffice to point out that equality of conditions in practice soon ceases to exist, as is the case with the present herring fishery in Alaska. An established industry with plants and special machinery might continue a less profitable use on account of its possession of facilities and the loss involved in change or abandonment, and make thereby serious inroads upon a supply which would otherwise actually be taken for food uses. It would then seem the part of justice to prohibit the lower use after such time or under such conditions as would secure the interdicted industry from serious loss.

The practice evidently has been, with the approval of public sentiment concerned, to make legislative choice as between material conflicting uses on the general grounds of higher and lower uses, as already discussed. In the concrete instance of the Alaska herring fishery, although some demand an immediate ban on its manufacture into fertilizer and oil, it is not clear that a material conflict of interests exists. As a matter of fact, owing to distance from market, high freights, and the necessity for competing with the British Columbia and Puget Sound packers, the Alaskan herring has not made its way to any great extent as a food fish. As bait for the halibut fishery it is in great demand, but when most needed the herring run is usually small, and the salted herring, while used, is inferior as bait. Both the food and bait uses combined consumed only about 20 per cent of the take in 1910, a season of abundance of herring. The rest was manufactured into fertilizer and oil. Certainly an exigent demand for herring for other purposes could have been met to a larger extent from the large run of the current season.

It is for the future rather than the present that it is desirable to take action looking toward the end of the use of herring as the raw material for fertilizer and oil. It is safe to assume that all the uses of the herring are destined to increase, and therefore at some future time a conflict of uses is probably inevitable. There is but one establishment engaged in the fertilizer and oil industry in Alaska. To prevent extensions of the business and provide for its termination without injury to existing interests it is only necessary to prohibit it by legislation effective at a future date, allowing ample time for the present concern to wind up its affairs. The Bureau has already through the Department recommended to Congress an early tentative date, in part for the sake of eliciting the facts on which to base a reasonable interim. Evidence has been taken on both sides of the question and a common ground reached for a settlement of the question which is believed to be just for all concerned. It is maintained and conceded that the continuance of the herring fertilizer and oil industry is likely to become inconsistent with public policy

respecting the fisheries. The Department on the other hand is inclined to allow a liberal term before any prohibition upon the industry shall become effective, and upon the fixing of this term the question may be said to pend. A few years' delay in the inauguration of this change, intended to hold indefinitely, is a matter of little moment to the fisheries, but of imminent importance to the industry.

STATISTICS.

The following tables show the condition of the herring industry in 1910:

PERSONS ENGAGED IN THE ALASKA HERRING FISHERIES IN 1910.

Occupation and race.	Southeast Alaska.	Central Alaska.	Total.
Fishermen:			
Vessel fisheries—			
Whites	59	....	59
Indians	4	....	4
Japanese	4	....	4
Total	67	....	67
Shore fisheries—			
Whites	30	9	39
Indians	5	....	5
Total	35	9	44
Shoresmen:			
Whites	35	2	37
Indians	31	2	33
Japanese	6	....	6
Total	72	4	76
Grand total	174	13	187

INVESTMENT IN THE ALASKA HERRING FISHERIES IN 1910.

Items.	Southeast Alaska.		Central Alaska.		Total.	
	No.	*Value.*	*No.*	*Value.*	*No.*	*Value.*
Fishing vessels:						
Steamers and launches	5	$32,300	....	....	5	$32,300
Tonnage	182	....	....	....	182	....
Outfit	....	12,000	....	....	....	12,000
Launches, under 5 tons	6	10,000	1	$1,200	7	[a] 11,200
Boats, sail and row	42	2,470	4	400	46	2,870
Scows	4	2,100	1	300	5	2,400
Apparatus:						
Vessel fisheries—						
Purse seines	10	3,995	....	....	10	3,995
Shore fisheries—						
Haul seines	1	75	3	400	4	475
Purse seines	9	1,495	....	....	9	1,495
Gill nets	1	500	....	....	1	500
Cash capital	....	80,000	....	2,000	....	82,000
Shore and accessory property	....	50,800	....	5,000	....	55,800
Total	....	195,735	....	9,300	....	205,035

[a] Includes outfit.

PRODUCTS OF THE ALASKA HERRING FISHERIES IN 1910.

Products.	Southeast Alaska.		Central Alaska.		Total.	
	Quantity.	*Value.*	*Quantity.*	*Value.*	*Quantity.*	*Value.*
Herring, fresh, for food.....pounds..	....	....	10,000	$300	10,000	$300
Herring, fresh, for bait.........do....	574,359	$5,203	....	....	574,359	5,203
Herring, frozen, for bait.......do....	522,500	5,225	....	....	522,500	5,225
Herring, pickled, for food...barrels..	979	9,056	216	1,728	1,195	10,784
Herring, pickled, for bait.....do....	1,906	3,199	....	....	1,906	3,199
Herring, salted, for food....pounds..	45,600	954	....	....	45,600	954
Herring eggs, dried, for food...do....	1,000	100	....	....	1,000	100
Herring fertilizer...............do....	2,617,000	40,000	....	....	2,617,000	40,000
Herring oil.................gallons..	277,000	55,000	....	....	277,000	50,000
Total..........................	....	113,737	....	2,028	....	115,765

FERTILIZER AND OILS.

The only plant operated this year for the preparation of fertilizer and oil from fish was that of the Alaska Oil & Guano Co. at Killisnoo, in southeast Alaska. During the fishing season the company's vessels caught 59,000 barrels of herring, as compared with 52,000 barrels of herring and 3,846 barrels of salmon in 1909.

The Revilla Reduction Works have constructed a plant for the treatment of dogfish and mud shark livers at Ketchikan, in southeast Alaska. While the plant is primarily for the extraction of oil from the livers, it is also hoped by the owners to be able to dry-salt the flesh for shipment as food to China and Japan, and to dry the skins for sale. Unfortunately the flesh so far treated has turned yellow and brown, and until this fault can be corrected it will be of little value. The plant was completed so late in the season that practically nothing was done this year.

THE CRAB FISHERY.

As stated in previous reports, crabs are exceedingly abundant in nearly every section of Alaska, but it is only in southeast Alaska that they are put to any considerable commercial use, many being consumed locally, while large numbers are shipped to the Puget Sound markets, and a few to points in the Northwest Territory, Canada.

The principal shipping places are Petersburg and Wrangell, and the fishermen from here crab on the flats in Dry Straits, opposite Ideal Cove, and at Scow Bay, in Wrangell Narrows. They use a rectangular pot of wooden framework, about 40 inches long, 18 inches high, and 30 inches wide, with 3½-inch stretch mesh net covering. The tunnels, of which there is one at each end, are 7 inches in width and 5 inches in height. These pots cost about $3 each.

The pots are set on trawls, about 25 or 30 to a trawl. Each is attached to a gangion about 5 fathoms long, thus permitting the raising and emptying of the pot without bringing to the surface the trawl itself. The trawls are marked by buoys and held by anchors.

On some of the trawls baited hooks are placed between the gangions for the purpose of catching bait for the pots. All sorts of fish, clams, etc., are used as bait.

When fishing the pots the fishermen throw back into the water all crabs under 6 inches in width, measured the broad way of the back, all females, and the soft-shell ones, the latter because there is usually very little meat in them.

At first the crabs shipped out of the district were packed alive in seaweed, but so many died on the way or arrived in bad condition that now all are boiled before being shipped. The shippers classify them as follows: Large, 7 inches and over; medium, 6½ to 7 inches; and small, 6 to 6½ inches. The prepared crabs are packed in boxes holding between 12 and 14 dozen each, and are set on their bottoms in three tiers with layers of ice at the bottom, between each tier, and at the top. The freight to Seattle is $7.50 per measured ton, which would include 35 dozens of crabs.

There is ample room for a large development of this industry, both in canning and marketing fresh, and it is probable this will take place as soon as knowledge of the abundant supplies to be had in Alaska becomes more general.

THE WHALE FISHERY.

The only shore whaling station in the United States where all the parts of a whale are utilized is at Tyee, at the lower end of Admiralty Island, in southeast Alaska, and this plant was operated more vigorously than ever this year. In addition to the steamer *Tyee, Junior,* and the gasoline schooner *Lizzie S. Sorrenson,* which composed the fleet in 1909, the steamer *Fearless* (85 net tons) was fitted out this year. In order to permit the fleet to operate more freely in the open ocean, where most of the whales are now killed, the bark *Diamond Head,* loaded with supplies of coal, gasoline, provisions, etc., was anchored in a convenient bay, to which the fleet could resort when in need and thus save the long trip to the station except when necessary to tow the catch there.

The *Lizzie S. Sorrenson* early in the season met a most unusual fate. As she was cruising around in the ocean about 8 miles southwest of Cape Addington the evening of May 10 a whale was sighted. She was cautiously worked to within gunshot and a harpoon driven into the animal. The weapon failed to reach a vital spot, and the whale made off at a terrific rate, but finding its progress checked it suddenly turned and charged directly at the vessel. Unavailing efforts were made by the crew to work the ship out of the way of the infuriated creature, and the whale, striking her a terrific blow in the stern, knocked out a portion of the bottom. Efforts made to plug the hole were without success, and as the pumps did not suffice, the crew took

to their boats and the vessel soon sank. Two days later the shipwrecked crew was picked up by the whaler *Fearless*.

The station fleet secured 146 whales, of which 6 were sperm whales and one a right whale. As the sperm and right whales produce more valuable by-products than the ordinary whales secured here, the financial return this year was better than in previous seasons. Since the fleet began fishing in the open ocean, moreover, a greater number of sulphur-bottom whales, which are the largest, have been secured, thus adding materially to the output of the station with but slight addition to the cost of operating in the interior waters. It is probable that the plant will be removed to a spot nearer the present scene of operations in order to eliminate the time and expense now necessary in order to get the killed whales from the grounds to the station.

There are a number of shore whaling stations along the Arctic shores of Alaska, at Cape Smythe, Point Hope, and Point Barrow. These stations are quite different affairs from the shore whaling station at Tyee, in southeast Alaska, being virtually trading stations which, in addition to their regular mercantile business, furnish the capital to outfit Eskimos who wish to hunt whales in the ocean close to shore. When a whale is killed the whalebone is removed and sold to the trader, while the natives eat or preserve as food as much of the blubber and flesh as they feel will be required to support them through the long winter. At Cape Smythe there are about 19 boats whaling, at Point Hope about 22, and at Point Barrow about 36 boats. The crews average about 8 men to a boat and the darting gun is quite generally used. The season lasts about 2 months, and comprises a part of April, all of May, and a part of June. The bone shipped out from these stations appears in the statistical tables.

Owing to the glut in the whalebone market, but few of the Arctic fleet operated this year. The fleet comprised the following: Steamer *Herman* (229 net tons), steamer *Karluk* (247 net tons), brigantine *Jeanette* (217 net tons), schooner *Rosie H.* (69 net tons) which went north in 1908, gasoline schooner *Confianza* (84 net tons), and the schooner *Lettitia* (233 net tons). The gasoline schooner *Olga* (43 net tons) sailed north in 1908 and was wrecked in the Arctic late in 1909, the news not coming out until this year. While whales were plentiful they were excessively shy and hard to approach. The fleet secured 27 whales, the *Karluk* alone taking 21, which however, represents two seasons' work on the part of the *Karluk*, she having spent the winter of 1909–10 in the North.

FURS.

Except in the case of fur seals and sea otters, no effort has heretofore been made to conserve the supply of fur-bearing animals of the district, but "An act to protect the seal fisheries of Alaska, and for

other purposes," approved April 21, 1910, consigns these resources to the charge of the Department of Commerce and Labor.

In accordance with section 4 of this law a set of regulations have been promulgated by the Secretary of Commerce and Labor, as given in full in the appendix to this report (p. 71).

The following table shows the number and value of furs of all kinds shipped from Alaska in 1910:

SHIPMENT OF FURS FROM ALASKA IN 1910.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	No.	*Value.*	*No.*	*Value.*	*No.*	*Value.*	*No.*	*Value.*
Bear, black	478	$4,935	326	$3,085	532	$3,821	1,336	$11,841
Bear, black, stuffed	1	20					1	20
Bear cubs, black, alive			4	125	2	10	6	135
Bear, black, skulls					1	10	1	10
Bear, blue			2	50			2	50
Bear, brown	4	75	27	1,285	2	200	33	1,560
Bear, brown, skulls			4	20	1	15	5	35
Bear, glacier	3	105	1	20			4	125
Bear, grizzly	3	30			3	115	6	145
Bear, polar	3	150			53	2,648	56	2,798
Bear castors						65		65
Bear galls			8	2			8	2
Beaver	368	1,922	608	2,763	1,026	5,883	2,002	10,568
Beaver castors				59		160		219
Coyote					11	6	11	6
Ermine	694	447	1,221	997	1,682	1,477	3,597	2,921
Fox, black	1	450			1	250	2	700
Fox, blue	2	60	492	14,730	660	5,636	1,154	20,426
Fox, blue, live			5	175			5	175
Fox, cross	2	20	156	1,007	199	1,822	357	2,849
Fox, grey			1	100			1	100
Fox, red	38	370	3,714	30,084	5,618	38,688	9,370	69,142
Fox, silver			50	8,650	3	390	53	9,040
Fox, silver grey			56	3,680	57	4,019	113	7,699
Fox, white			13	120	1,989	20,443	2,002	20,563
Hares, arctic	4	4					4	4
Lynx	182	3,541	85	1,856	782	18,685	1,049	24,082
Marten	403	4,294	462	3,738	4,702	41,319	5,567	49,351
Mink	4,230	22,081	2,534	10,138	16,974	76,369	23,738	108,588
Muskrat	12,738	5,086	4,479	917	206,676	69,245	223,893	75,248
Otter, land	493	5,213	447	4,493	921	8,843	1,861	18,549
Otter, sea	3	600	24	5,900	4	720	31	7,170
Otter pups, sea			1	5	2	32	3	37
Rabbit					4	4	4	4
Seal, fur	138	4,207			[b] 14,246	468,042	14,384	472,249
Seal, unborn pup fur					[c] 121	12	121	12
Squirrel	20	5	180	39	9	2	209	46
Weasel	36	24	62	31	11	15	109	70
Wolf	57	281	5	40	16	86	78	407
Wolverine	28	175	75	397	7	42	110	614
Total		54,095		94,506		769,024		917,625

[a] This table does not take into account the shipments of furs by mail nor of those carried out among the personal effects of passengers.
[b] Of these 660 skins were from seized Japanese schooners and were sold by the United States marshal for $23,100.
[c] These were also from the above seized Japanese schooners and were sold by the United States marshal.

AQUATIC FURS.

BEAVER.

This is the most valuable fur-bearing aquatic animal found in the interior waters of Alaska, and has been hunted with such vigor that its ultimate extinction seems to be now but a question of a few years. The range of this animal covers all of the mainland of Alaska, except-

ing only the belt of barren-coast country bordering the Arctic Ocean from Point Hope north and east to the Canadian line. It is also found on a few of the islands in southeast Alaska, and generally in the lakes and streams of the interior, avoiding the large rivers, owing to the great change in level likely to occur at different seasons. During the last three years a considerable proportion of the supply has come from the Kuskokwim and Yukon Valleys. The natives catch beavers in steel traps set at a frequented spot or shoot them from a concealed place near the beaver house or dam.

Castoreum, an oily odorous compound secreted by the preputial glands of the animal, also the dried preputial follicles and their contents, are sometimes prepared and find a sale in China, where they occupy a place in the pharmacopœia.

In 1905, 1,935 skins; in 1906, 1,536; 1907, 1,159; 1908, 1,280; 1909, 2,323, and in 1910, 2,002 skins were secured.

MUSKRAT.

This animal is found on the mainland, except along the extreme northern coast line, wherever bogs and ponds or running water occur; it is also found upon Nunivak and St. Michaels Islands. The Kuskokwim and Yukon Valleys, especially the former, furnish the vast majority of the output. The natives also use a large number each year for clothing and in barter with other native tribes. The value of muskrat has been steadily increasing during the last three years and as a result the animal has been hunted more vigorously each season. In 1905, 12,599 skins, valued at $1,192; in 1906, 3,611 skins, valued at $302; in 1907, 6,481 skins, valued at $498; in 1908, 31,712 skins, valued at $6,257; in 1909, 121,568 skins, valued at $34,074, while in 1910, 223,893 skins, valued at $75,248, were secured and shipped from the district. This takes no account of the local trade in skins between the different tribes.

LAND OTTER.

This species is widely distributed in Alaska, being found on nearly every part of the mainland. It also occurs on many of the islands. A steel trap is generally used in capturing the animals. The supply of land otter skins is fairly constant from year to year.

SEA OTTER.

But two vessels, the schooner *Everett Hays*, owned by Mr. Samuel Applegate, of Unalaska, and the schooner *Elvira* (formerly the Japanese sealing schooner *Kinsei Maru*), owned by Mr. Fred Schroeder of Dutch Harbor, fitted out for sea-otter hunting in 1910. The hunting is generally carried on between Chirikof and Tugidak Islands (the

latter one of the Trinity Islands) in central Alaska, and the season is from about May 15 to September 1, depending largely upon the state of the weather. This year the weather was very rough and as a result there were only about four days of actual hunting throughout the whole season. The *Everett Hays* secured 4 skins, while the *Elvira* took 12, a total of 16.

A few natives living at Kayak this year hunted for sea otter off Cape St. Elias and on June 7 shot two and on June 15 one. These skins were sold at the near-by town of Katalla.

Mr. Nils Christensen, of Cold Bay, on the Alaska Peninsula, hunts sea otters in winter along the reefs offshore, but secured nothing last winter. The same was true of Mr. Charles Rosenberg, who patrols a stretch of some 30 miles of beach on the Bering Sea side of Unimak Island on the lookout for dead sea otter which may be washed ashore.

This summer a native killed a sea otter near the Naknek River in Bristol Bay, where they are very rarely to be found. One was also killed in the neighborhood of Unga Island in central Alaska.

The Canadian sealing fleet again devoted a considerable part of its energies to the hunting of sea otter off Chirikof Island. The schooner *Thos. F. Bayard* secured two, while the *Pescawha* secured seven.

Several vessels from the Japanese sealing fleet also engaged in sea otter hunting, but with what success we are unable to state, owing to their secretiveness in such matters.

FUR SEAL.

The only place on the coast of Alaska which maintains a fur-seal fishery is Sitka. In April and May the herd passes Baranof Island, on which Sitka is located, on its way to the Pribilof Islands in Bering Sea, to breed. About the middle of April the native hunters, who are the only persons permitted to engage in the work, with their families, leave for the hunting grounds and establish their camps on Tava, Wrangell, and Biorka Islands, small islands a few miles from Sitka.

This year 10 boat parties had their headquarters on Biorka Island, four on Wrangell Island, and 18 on Tava Island. Each boat party is composed of from 3 to 5 men, and these use sailboats costing about $130 each. Repeating shotguns, costing from $25 to $35 each, are the only weapons used. The hunting is done in the open ocean, and the boats from the various camps cover an area of from 35 to 50 miles directly out from shore and about the same distance up and down the coast. Good weather is essential, and in 1910 the natives were unfortunate, bad weather being frequent, with the result that the catch was very small.

This year 135 skins were taken and sold at a price aggregating $4,117 (price paid the hunters and not the London price). In numbers this is a big decrease from last year, when the natives secured 396 skins. Prices received for the skins averaged much higher than in 1909, when $18.60 was received per skin, as compared with $30.50 this year.

The Biorka Island parties secured 50 skins, the Wrangell Island parties 13, and the Tava Island parties 72. The largest number secured by any one boat was 8.

In outfitting these boats the hunter, who is head man, furnishes the boat and gun, while the rowers furnish the ammunition and food. The gross proceeds arising from the sale of the skins taken are divided equally among the crew, with the exception of the hunter, who gets $3 or $4 more than the others.

The hunting parties return to Sitka the latter part of May. A committee of two is then appointed to supervise the sale of the skins, which usually takes place on a date between June 1 and 5, when the buyers from the States have reached Sitka. On sale day the skins are all brought to one house, where they are sorted into three sizes—"small," "medium," and "large"—care being taken to keep each boat's catch separate from the others. The "small" skins are those of the pups born during the previous two years. The "medium" skins are said to have the best fur, but the buyers prefer the "large" ones on account of their size. The buyers are not allowed to pick out the choice skins and bid on these alone, but must take them as they run, the subdivision in the beginning being made merely in order that the buyers may see what they are bidding on.

These skins are usually much sought after by the dealers, because, being taken by the natives, and a certificate from the collector of customs to this effect being attached to the catch, they can, under the law, be sent abroad to be cleaned and dyed and brought back to be sold in our markets. The possession of such a certificate is considered to add about $10 to the value of the skin.

The Japanese schooners were again troublesome. During bad weather, when the natives could not go out with their small boats, the schooners came in close, and then when the good weather came they would work out just ahead of the native boats and pick up most of the seals.

The Japanese sealing schooner *Kaise Maru*, which was seized on May 3, 1909, by the deputy marshal at Sitka, is still at that place. The crew were charged with killing seals within the 3-mile limit, and also landing on certain islands near by. They were tried at Juneau in September of the same year and acquitted, but the owners failed to resume possession of their vessel after their release.

In 1909 revenue cutters seized the Japanese sealing schooners *Saikai Maru* and *Kinsei Maru*, and charged them with sealing within the 3-mile limit of the Pribilof Islands. The captured vessels were taken to Unalaska and later the officers and men were carried to Valdez, where all were tried and convicted at the November term of court. Condemnation proceedings against the vessels were instituted, and on April 18 of this year the deputy marshal at Unalaska sold the vessels with their stores and equipment, the *Kinsei Maru* bringing $4,600 and the *Saikai Maru* $321.50. When seized the schooners had 660 seal skins, and these sold for $21,780. The vessels were purchased by Mr. Fred Shroeder, of Dutch Harbor, who renamed the *Kinsei Maru* the *Elvira*, and outfitted and sent her out this year on a sea-otter cruise. The skins sold have been included in the statistical tables of this report.

This year the Treasury Department adopted the policy of permitting sealing vessels to take on merely enough water to carry them to the nearest United States port, or if homeward bound, to take them home. Heretofore the vessels have taken aboard water whenever and wherever they pleased, thus being enabled to extend their cruise indefinitely. Several sealing vessels which visited ports in southeast and central Alaska were affected by this rule. Under the law no resident of the United States is permitted to furnish supplies to a sealer at any time.

The lease of the North American Commercial Co. of the Pribilof Islands expired this year, and the Government, through this Department, took possession of the islands. From St. Paul Island 10,754 skins were shipped, while St. George shipped 2,834, a total of 13,586.

MISCELLANEOUS AQUATIC MAMMALS.

HAIR SEALS.

These animals are to be found all along the coast of Alaska, occurring in places in almost countless numbers. While they form a very insignificant part of the commerce in which the white traders participate, owing to the fact that their fur is worthless, they are of immense value to the natives, for from the flesh and oil is secured a considerable part of the winter food, while the skins are highly prized for covering the kayaks and umiaks, and for boot soles, trousers, mittens, clothing bags, and caps, and when cut into strips make a very strong and durable cord. The coast natives also barter the flesh, oil, and skins with the interior tribes for reindeer hides and furs, thus creating a very important branch of trade of which it is impossible to form an accurate idea, owing to the inaccessibility of most of the tribes and the secrecy they observe when discussing such matters with white men.

WALRUSES.

This animal, which is not found south of the Bering Sea shore of the Aleutian chain, was at one time very numerous north of there, and the hunting of it and the seal formed the principal occupation of the Eskimos during the summer. It goes north as the ice breaks up in the spring and returns again in the fall, stopping but a short time at any spot and keeping close to the ice pack all this time.

While the hunting was carried on solely by the natives the herd suffered no appreciable diminution, but in 1868 the whalers began to turn their attention to walrus catching with serious results to the natives, as set forth in a former report.[a]

> To many of the Eskimos, especially on the Arctic shore, the walrus is almost a necessity of life, and the devastation wrought amongst the herds by the whalers has been, and is yet, the cause of fearful suffering and death to many of the natives. The flesh is food for man and dogs; the oil is used for food and for lighting and heating the houses; the skin, when tanned and oiled, makes a durable cover for the large skin boats; the intestines make waterproof clothing, window covers, and floats; the tusks are used for lance or spear points or are carved into a great variety of useful and ornamental objects, and the bones are used to make heads for spears and for other purposes.
>
> During the first part of every season there is but little opportunity to capture whales, they being within the limits of the icy barrier. As a result much of the whalers' time during July and August was devoted to capturing walruses. Men would be landed on the shore in June and left to watch for the animals to haul up on the beach at certain points. The walrus must either come ashore or get on the ice, and when a herd is well ashore one or two old bulls are generally left on watch. The best shot among the hunters now creeps up, and by a successful rifle shot or two kills the guard. Owing to their very defective hearing the noise made by the rifle does not awaken them. The gun is then put aside and each hunter, armed with a sharp ax, approaches the sleeping animals and cuts the spines of as many of them as possible before the others become alarmed and stampede for the water and escape.

The natives hunt the walrus in kayaks, with ivory-pointed spears and sealskin line and floats. When the animal is exhausted by its efforts to escape, the hunters draw near and give the death stroke with a lance.

In 1908 Congress passed an act for the protection of game in Alaska, and in this the killing of walrus north of latitude 62° was permitted only from August 1 to December 10, both inclusive, while no one person was permitted to kill more than one.

This year new regulations were promulgated by the Department of Agriculture, and in these the open season for walruses in Bering Sea and Strait north of the Kuskokwim River is from May 1 to July 1, while all killing in Bristol Bay and Bering Sea south of the Kuskokwim River is prohibited until 1912.

As the natives are permitted to kill the walrus for food and clothing at any time when in need of food, the object of the law, which is

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[a] The Commercial Fisheries of Alaska in 1905. By John N. Cobb, Bureau of Fisheries Document 603, p. 35, 1906.

to prevent the indiscriminate killing by whites, is accomplished, and very few of the animals are now killed except by the few sportsmen who visit the Bering Sea district in summer. This year's reports indicate that walruses are increasing. The inspector of fisheries for Alaska saw a large number on the ice in Bristol Bay in May, while the master of the trading schooner *Helen Johnston* claims to have encountered in Bering Strait, near the Diomede Islands, on July 5 a large herd of swimming walruses which covered several acres of water. Capt. S. F. Cottle, of the steam whaler *Karluk*, reports having seen large pods of walruses this year.

LICENSE TAXES AND HATCHERY REBATES.

Under the provisions of the act for the protection and regulation of the fisheries of Alaska (approved June 26, 1906) the packers in Alaska are compelled to pay license fees or taxes on their season's output, as noted in the table following. The collection of these license fees or taxes is in the hands of the clerk of the court of the judicial district in which the packer is operating. The law literally requires the packer to pay the license fee in advance, but as the fee is based upon the pack he makes and it would be impossible in such an uncertain industry as fishing to estimate in advance exactly the quantity that will be packed, it is the custom to require the operator to apply for a license before beginning operations and then at the end of the season make return of the amount due the district.

The following table shows the quantity of taxable fishery products prepared, the stated license tax on the product, and the total amount of tax due on each. The last item is approximate, being based upon returns on file at this Bureau, some of which are sworn to and some estimated, and therefore perhaps varying somewhat from those sent to the clerk of the court. It is not probable, however, that the amount given will vary much either way from the correct amount as shown by the returns of the clerks:

LICENSE TAXES ON PREPARED FISHERY PRODUCTS.

Items.	Unit of quantity.	Quantity prepared.	License tax per unit of quantity.	Estimated amount of tax due.
Canned salmon	Cases	2,413,052½	$0.04	$100,522.08
Pickled salmon	Barrels	14,405	.10	1,440.50
Mild-cured salmon	Tierces [a]	3,357	.40	1,342.80
Dry-salted salmon in bulk	100 pounds	77,478	.05	37.70
Fish oil	Barrels	578	.10	57.80
Fertilizer, from fish	Tons	1,308½	.20	261.70
Fertilizer, from whales	do	435	.20	87.00
Total				103,749.58

[a] As the net weight of a tierce of fish is 800 pounds, this item is figured on a basis of 4 barrels to the tierce in working out the amount of tax.

The following table shows the name of the owner, location of each private salmon hatchery operated during the year ending June 30, 1910, the number of salmon (red) liberated, and the amount of rebate certificates due each hatchery:

REBATES CREDITED TO PRIVATE SALMON HATCHERIES IN 1910.[a]

Owners.	Location.	Red salmon fry liberated.	Rebate due.
Alaska Packers Association	Naha Stream	40,725,000	$16,290
	Karluk Stream	35,875,000	14,350
Northwestern Fisheries Co	Quadra Lake	9,850,000	3,940
	Hetta Lake	8,000,000	3,200
North Pacific Trading & Packing Co	Klawak Lake	5,300,000	2,120
Total		99,750,000	39,900

[a] Some of the hatcheries did not complete their distribution of fry before July 1; those remaining will be counted next year.

COMPLAINTS AND PROSECUTIONS.

On Sunday, May 22, in Taku Inlet, southeast Alaska, the assistant agent discovered Henry Hoeke, S. Nelson, John Hanula, Tom Carvo, Abraham Lahti, Oscar Lustig, Van Oleson, and Ole Oleson fishing during the weekly closed season. All were brought before the United States commissioner at Juneau for preliminary hearing and bound over to the next grand jury. On October 24 all were indicted by the grand jury held at Ketchikan, and on the 29th of the same month all but Van and Ole Oleson pleaded guilty. S. Nelson and Henry Hoeke were fined $50 each, while the others were fined $25 each. The Oleson brothers elected to be tried in Juneau, and on December 10 they appeared in court there and pleaded guilty; sentence was deferred for six months.

In October a man named Mitchell was reported by other fishermen as violating the weekly closed season in the Taku River. He was indicted by the December grand jury, but was acquitted upon his trial the same month.

A visit to Tamgas Stream, a tributary of Tamgas Harbor, on the south end of Annette Island, in southeast Alaska, on July 25, developed the fact that a trap was being fished in the creek in violation of the law. Tamgas Stream is a short and narrow stream draining a lake, and a run of red and other salmon annually ascends the stream. About 300 yards from its mouth are a succession of cascades and falls. In the narrowest part of the cascades a rack had been constructed of poles driven into the bottom and covered with wire netting in such way as almost wholly to prevent salmon from passing up, the portion uncovered being too steep for any but the strongest to surmount. Just below and running parallel to the rack, and at right angles to the shore, was constructed a flume, with a flaring

mouth at the outer end; at the shore end a sharp turn of the flume led into a square box with slat bottom and covered over with boughs. The fish in ascending the stream would be stopped by the rack and in swimming around at the outer end many of them would be carried by the current into and down the flume, eventually landing in the receiving box at the end.

Inquiry among the few Indians camped near the mouth of the stream developed the fact that a native named James, of Metlakahtla, who died last winter, had first constructed the trap several years ago. This spring his two sons, boys under 18 years of age, rebuilt the trap. They were ordered to remove it and did so at once. Owing to the youth of the offenders and other extenuating circumstances, the matter was not presented to the United States attorney for action.

On July 6 Mr. Nels Moen, of Wrangell, complained in regard to the location of the Alaska Packers Association trap in Humpback Bay, Bradfield Canal, and also said his partner in the operation of a rival trap in the same bay, Mr. Oscar Williamson, could prove that the association's trap had been fishing on Sunday, July 3. As soon as possible thereafter a visit was made to Humpback Bay, where an inspection of the trap showed that it was constructed and placed in conformity with the law. As Mr. Williamson was confident of having evidence enough to justify his charge that the trap had been operated during the weekly closed season, the matter was brought before the United States commissioner at Wrangell, Mr. Williamson making the sworn complaint. Mr. H. A. Oleson, the trap foreman, was arrested and brought to Wrangell for preliminary hearing. The evidence, however, clearly showed no intent at violating the law and the defendant was discharged.

On the occasion of a visit to Sarkar Stream, on the west coast of Prince of Wales Island, southeast Alaska, on August 26, Mr. Fred Brockman was discovered fishing a gill net which had been stretched from bank to bank. The net had 13 coho salmon in it at the time. Brockman was arraigned before the United States commissioner at Wrangell on September 3 and by him was bound over to the next grand jury, which began its sessions at Ketchikan on October 24 and indicted the defendant on the same date. On October 24 he appeared in court and pleaded guilty. Owing to the defendant's physical condition the court imposed the small fine of $25, but gave an impressive warning that the next offender appearing in court charged with this serious offense would be severely dealt with.

In the latter part of July several natives reported to the deputy marshal at Sitka that native fishermen were fishing within the prohibited area around the mouth of Necker Stream, which empties into Necker Bay, on the west coast of Baranof Island, in southeast Alaska. Twenty-five natives were brought in by the deputy marshal and

given a hearing before the United States commissioner at Sitka, who discharged all of the defendants, however, for lack of evidence.

Several complaints were made in regard to alleged illegal fishing by gill netters operating in Karta Bay, Prince of Wales Island, southeast Alaska, but diligent search failed to substantiate any of these, and as the nets were soon withdrawn the complaints, which had come from purse seiners, ceased.

On June 25 the deputy marshal and deputy collector of customs at Cordova visited Eyak River and found Perry and Causa Sabella, fishermen employed by the Northwestern Fisheries Co. at Orca, with a gill net stretched from shore to shore. The net held at the time of the visit some 40 or 50 fish. The men were brought before the United States commissioner at Cordova and fined $1 and costs, amounting in all to $50 each.

An evil which at present is slight, but will grow more and more serious as the district becomes more settled and the superabundant water power, which at present largely goes to waste, is harnessed and made to serve the purposes of the manufacturer, prospector, lumberman, etc., is the building of dams in streams which the salmon frequent. By the terms of the law it is—

> unlawful to erect or maintain any dam, barricade, fence, trap, fish wheel, or other fixed or stationary obstruction, except for purposes of fish culture, in any of the waters of Alaska at any point where the distance from shore to shore is less than five hundred feet, * * * with the purpose or result of capturing salmon or preventing or impeding their ascent to their spawning grounds, and the Secretary of Commerce and Labor is hereby authorized and directed to have any and all such unlawful obstructions removed or destroyed.

In the past, builders of such obstructions have been very negligent in consulting the salmon agents in regard to the legality of their structures, and as a result considerable expense has been caused to them by their failure to observe the plain provisions of the law. Where some municipal or commercial benefit is to result the agents have been willing to meet the parties more than half way and to supply all needful plans for the placing of fishways in such dams where feasible.

PROPOSED LEGISLATION.

At the hearings held between April 19 and May 25, before the Committee on the Territories of the House of Representatives, on H. R. 22579, Sixty-first Congress, second session, known as the Wickersham bill, in amendment of the Alaska fisheries law of June 26, 1906, representatives of the Bureau furnished statements and testimony bearing on the provisions of this bill in their relation to the fisheries. At the close of these hearings the following letter was transmitted by the Secretary of Commerce and Labor in response to a request for the opinion of the Department with respect to changes or additions

desirable in the law. The proposals for legislation increase the taxes somewhat, and aim to extend and increase the power of the Department over all Alaskan fisheries save the fur seal.

DEPARTMENT OF COMMERCE AND LABOR,
OFFICE OF THE SECRETARY,
Washington, May 25, 1910.

Hon. E. L. HAMILTON,
Chairman Committee on the Territories,
House of Representatives, Washington, D. C.

SIR: In reply to your letter of the 20th instant, in which you request the opinion of the Department with respect to changes advisable in the present Alaska fisheries law, after consideration of the act of June 26, 1906, section by section, the following recommendations are submitted:

1. Sections 5, 7, 8, 10, 11, 12, 13, 14, 15, and 16 are satisfactory.

2. Section 1 should be modified in accordance with the schedule already submitted at the hearing of May 3. This schedule is along the lines indicated by Judge Wickersham in H. R. 22579.

3. Section 2 should remain until more adequate facilities are provided for fish-cultural work by the Federal Government. All fish-cultural work in Alaska should eventually be carried on by the Federal Government. This can be brought about by the abolition of the present exemption system, the taking over of such private hatcheries as the owners may desire to turn over to the Government, and the establishment of additional Federal hatcheries.

4. In section 3, line 2, strike out the words "for purposes of fish-culture" and insert in lieu thereof "by direction of the Secretary of Commerce and Labor"; and in lines 4 and 5 strike out the words "where the same is less than five hundred feet in width."

5. In section 4, line 2, strike out the words "for purposes of fish culture" and insert in lieu thereof "by direction of the Secretary of Commerce and Labor."

6. In section 6, lines 6 and 7, strike out the words "five hundred yards of the mouth thereof" and insert in lieu thereof "such distance from the mouth thereof as in his judgment is necessary."

7. The matter covered by section 9 is now fully covered by the pure food and drugs act, food inspection decision No. 105, and this section may therefore be omitted.

8. The following additional sections are now recommended:

"SECTION —. That for the purposes of this act the Secretary of Commerce and Labor is authorized to determine and indicate by suitable markers the mouth of any creek, stream, or river in Alaska which salmon enter for spawning purposes.

"SEC. —. That the Secretary of Commerce and Labor is authorized and directed to establish such regulations, not inconsistent with existing law, as may in his judgment be necessary for the proper protection and conservation of shellfish and other aquatic animals not otherwise mentioned in this act.

"SEC. —. That it shall be unlawful to erect, maintain, or operate in Alaska any new establishment for canning or otherwise preserving for commercial use any salmon or other fish or fishery product, or to increase the capacity of any such existing establishment, or to reopen and operate any such establishment which has remained closed for the period of three years immediately preceding the passage of this act, without first obtaining the approval in writing of the Secretary of Commerce and Labor.

"*Provided, however,* That in the case of salmon-packing establishments approval shall be withheld only when in his judgment the fishing operations and investigations in the region adjacent to the proposed location indicate that the number of salmon taken is larger than the reproductive increase of salmon from adjacent spawning grounds: *And provided further,* That in case approval is withheld the applicant interested shall upon demand be given a hearing, of which he shall be notified at least thirty days previously.

"SEC. —. That it shall be unlawful, after January first, nineteen hundred and eleven, to utilize any part of any food fish save the offal and refuse thereof in the manufacture of fertilizer or fish oil.

"SEC. —. That the provisions of sections thirteen and sixteen of chapter four hundred and twenty-five of an act entitled 'An act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes,' approved March third, eighteen hundred and ninety-nine, shall be applied to the protection of the fisheries of Alaska, and the Secretary of Commerce and Labor and his agents for the protection of the salmon fisheries of Alaska, and any officer or employee of the Department of Commerce and Labor designated by him, shall be charged with the enforcement of said section thirteen and shall have the same power and authority in all respects to swear out process and arrest as the several officials named in section seventeen of chapter four hundred and twenty-five of the above act."

Respectfully,

CHARLES NAGEL, *Secretary.*

There is pending before Congress a measure for reorganization and expansion of the Alaska work of the Bureau of Fisheries, under the one head of Alaska Fisheries Service. This division will include, if the law is enacted, the salmon-inspection service and the fur-seal service, together with supervision of all other fisheries and fur resources of Alaska.

RECOMMENDATIONS.

1. That vessels be provided for the inspection service as recommended in the report for 1909, and that immediate provision be made for the two smaller launches requested, as the most urgent needs of the service, for use during the 1911 season.

2. That in addition to the recommendations contained in departmental letter of May 25, 1910, printed on page 64 of this report, for the amendment of the present fisheries act of June 26, 1906, the weekly close season for salmon, as expressed in section 5 of the existing law, be extended over all Alaskan waters except Bering Sea and its arms; and that in sections 3 and 4 the word "salmon" be substituted for red salmon.

APPENDIX—FISHERY LAWS AND REGULATIONS.

The following laws relating to the fisheries and fur-bearing animals of Alaska, and the regulations established thereunder, which are now in force in the District, are published herewith for the guidance of those interested:

AN ACT for the protection and regulation of the fisheries of Alaska.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That every person, company, or corporation carrying on the business of canning, curing, or preserving fish or manufacturing fish products within the territory known as Alaska, ceded to the United States by Russia by the treaty of March thirtieth, eighteen hundred and sixty-seven, or in any of the waters of Alaska over which the United States has jurisdiction, shall, in lieu of all other license fees and taxes therefor and thereon, pay license taxes on their said business and output as follows: Canned salmon, four cents per case; pickled salmon, ten cents per barrel; salt salmon in bulk, five cents per one hundred pounds; fish oil, ten cents per barrel; ertilizer, twenty cents per ton. The payment and collection of such license taxes shall be under and in accordance with the provisions of the Act of March third, eighteen hundred and ninety-nine, entitled "An Act to define and punish crimes in the district of Alaska, and to provide a code of criminal procedure for the district," and amendments thereto.

SEC. 2. That the catch and pack of salmon made in Alaska by the owners of private salmon hatcheries operated in Alaska shall be exempt from all license fees and taxation of every nature at the rate of ten cases of canned salmon to every one thousand red or king salmon fry liberated, upon the following conditions:

That the Secretary of Commerce and Labor may from time to time, and on the application of the hatchery owner shall, within a reasonable time thereafter, cause such private hatcheries to be inspected for the purpose of determining the character of their operations, efficiency, and productiveness, and if he approve the same shall cause notice of such approval to be filed in the office of the clerk or deputy clerk of the United States district court of the division of the district of Alaska wherein any such hatchery is located, and shall also notify the owners of such hatchery of the action taken by him. The owner, agent, officer, or superintendent of any hatchery the effectiveness and productiveness of which has been approved as above provided shall, between the thirtieth day of June and the thirty-first day of December of each year, make proof of the number of salmon fry liberated during the twelve months immediately preceding the thirtieth day of June, by a written statement under oath. Such proof shall be filed in the office of the clerk or deputy clerk of the United States district court of the division of the district of Alaska wherein such hatchery is located, and when so filed shall entitle the respective hatchery owners to the exemption as herein provided; and a false oath as to the number of salmon fry liberated shall be deemed perjury and subject the offender to all the pains and penalties thereof. Duplicates of such statements shall also be filed with the Secretary of Commerce and Labor. It shall be the duty of such clerk or deputy clerk in whose office the approval and

proof heretofore provided for are filed to forthwith issue to the hatchery owner, causing such proofs to be filed, certificates which shall not be transferable and of such denominations as said owner may request (no certificate to cover fewer than one thousand fry), covering in the aggregate the number of fry so proved to have been liberated; and such certificates may be used at any time by the person, company, corporation, or association to whom issued for the payment pro tanto of any license fees or taxes upon or against or on account of any catch or pack of salmon made by them in Alaska; and it shall be the duty of all public officials charged with the duty of collecting or receiving such license fees or taxes to accept such certificates in lieu of money in payment of all license fees or taxes upon or against the pack of canned salmon at the ratio of one thousand fry for each ten cases of salmon. No hatchery owner shall obtain the rebates from the output of any hatchery to which he might otherwise be entitled under this Act unless the efficiency of said hatchery has first been approved by the Secretary of Commerce and Labor in the manner herein provided for.

SEC. 3. That it shall be unlawful to erect or maintain any dam, barricade, fence, trap, fish wheel, or other fixed or stationary obstruction, except for purposes of fish culture, in any of the waters of Alaska at any point where the distance from shore to shore is less than five hundred feet, or within five hundred yards of the mouth of any red-salmon stream where the same is less than five hundred feet in width, with the purpose or result of capturing salmon or preventing or impeding their ascent to their spawning grounds, and the Secretary of Commerce and Labor is hereby authorized and directed to have any and all such unlawful obstructions removed or destroyed.

SEC. 4. That it shall be unlawful to lay or set any drift net, seine, set net, pound net, trap, or any other fishing appliance for any purpose except for purposes of fish culture, across or above the tide waters of any creek, stream, river, estuary, or lagoon, for a distance greater than one-third the width of such creek, stream, river, estuary, or lagoon, or within one hundred yards outside of the mouth of any red-salmon stream where the same is less than five hundred feet in width. It shall be unlawful to lay or set any seine or net of any kind within one hundred yards of any other seine, net, or other fishing appliance which is being or which has been laid or set in any of the waters of Alaska, or to drive or construct any trap or any other fixed fishing appliance within six hundred yards laterally or within one hundred yards endwise of any other trap or fixed fishing appliance.

SEC. 5. That it shall be unlawful to fish for, take, or kill any salmon of any species in any manner or by any means except by rod, spear, or gaff, in any of the waters of Alaska over which the United States has jurisdiction, except Cook Inlet, the Delta of Copper River, Bering Sea, and the waters tributary thereto, from six o'clock postmeridian of Saturday of each week until six o'clock antemeridian of the Monday following, or to fish for, or catch, or kill in any manner or by any appliances except by rod, spear, or gaff, any salmon in any stream of less than one hundred yards in width in Alaska between the hours of six o'clock in the evening and six o'clock in the morning of the following day of each and every day of the week. Throughout the weekly close season herein prescribed the gate, mouth, or tunnel of all stationary and floating traps shall be closed, and twenty-five feet of the webbing or net of the "heart" of such traps on each side next to the "pot" shall be lifted or lowered in such manner as to permit the free passage of salmon and other fishes.

SEC. 6. That the Secretary of Commerce and Labor may, in his discretion, set aside any streams or lakes as preserves for spawning grounds, in which fishing may be limited or entirely prohibited; and when, in his judgment, the results of fishing operations in any stream, or off the mouth thereof, indicate that the number of salmon taken is larger than the natural production of salmon in such stream, he is authorized to establish close seasons or to limit or prohibit fishing entirely for one year or more within such stream or within five hundred yards of the mouth thereof, so as to permit salmon to increase: *Provided, however*, That such power shall be exercised only after

all persons interested shall be given a hearing, of which due notice must be given by publication; and where the interested parties are known to the Department they shall be personally notified by a notice mailed not less than thirty days previous to such hearing. No order made under this section shall be effective before the next calendar year after same is made: *And provided further,* That such limitations and prohibitions shall not apply to those engaged in catching salmon who keep such streams fully stocked with salmon by artificial propagation.

Sec. 7. That it shall be unlawful to can or salt for sale for food any salmon more than forty-eight hours after it has been killed.

Sec. 8. That it shall be unlawful for any person, company, or corporation wantonly to waste or destroy salmon or other food fishes taken or caught in any of the waters of Alaska.

Sec. 9. That it shall be unlawful for any person, company, or corporation canning, salting, or curing fish of any species in Alaska to use any label, brand, or trade-mark which shall tend to misrepresent the contents of any package of fish offered for sale, *Provided,* That the use of the terms "red," "medium red," "pink," "chum," and so forth, as applied to the various species of Pacific salmon under present trade usages shall not be deemed in conflict with the provisions of this Act when used to designate salmon of those known species.

Sec. 10. That every person, company, and corporation engaged in catching, curing, or in any manner utilizing fishery products, or in operating fish hatcheries in Alaska, shall make detailed annual reports thereof to the Secretary of Commerce and Labor, on blanks furnished by him, covering all such facts as may be required with respect thereto for the information of the Department. Such reports shall be sworn to by the superintendent, manager, or other person having knowledge of the facts, a separate blank form being used for each establishment in cases where more than one cannery, saltery, or other establishment is conducted by a person, company, or corporation, and the same shall be forwarded to the Department at the close of the fishing season and not later than December fifteenth of each year.

Sec. 11. That the catching or killing, except with rod, spear, or gaff, of any fish of any kind or species whatsoever in any of the waters of Alaska over which the United States has jurisdiction, shall be subject to the provisions of this Act, and the Secretary of Commerce and Labor is hereby authorized to make and establish such rules and regulations not inconsistent with law as may be necessary to carry into effect the provisions of this Act.

Sec. 12. That to enforce the provisions of this Act and such regulations as he may establish in pursuance thereof, the Secretary of Commerce and Labor is authorized and directed to depute, in addition to the agent and assistant agent of salmon fisheries now provided by law, from the officers and employees of the Department of Commerce and Labor, a force adequate to the performance of all work required for the proper investigation, inspection, and regulation of the Alaskan fisheries and hatcheries, and he shall annually submit to Congress estimates to cover the cost of the establishment and maintenance of fish hatcheries in Alaska, the salaries and actual traveling expenses of such officials, and for such other expenditures as may be necessary to carry out the provisions of this Act.

Sec. 13. That any person, company, corporation, or association violating any provision of this Act or any regulation established in pursuance thereof shall, upon conviction thereof, be punished by a fine not exceeding one thousand dollars or imprisonment at hard labor for a term of not more than ninety days, or by both such fine and imprisonment, at the discretion of the court; and in case of the violation of any of the provisions of section four of this Act and conviction thereof a further fine of not more than two hundred and fifty dollars per diem may, at the discretion of the court, be imposed for each day such obstruction is maintained. And every vessel or other apparatus or equipment used or employed in violation of any provision of this Act, or

of any regulation made thereunder, may be seized by order of the Secretary of Commerce and Labor, and shall be held subject to the payment of such fine or fines as may be imposed.

SEC. 14. That the violation of any provision of this Act may be prosecuted in any district court of Alaska or any district court of the United States in the States of California, Oregon, or Washington. And it shall be the duty of the Secretary of Commerce and Labor to enforce the provisions of this Act and the rules and regulations made thereunder. And it shall be the duty of the district attorney to whom any violation is reported by any agent or representative of the Department of Commerce and Labor to institute proceedings necessary to carry out the provisions of this Act.

SEC. 15. That all Acts or parts of Acts inconsistent with the provisions of this Act are, so far as inconsistent, hereby repealed.

SEC. 16. That this Act shall take effect and be in force from and after its passage.

Approved, June 26, 1906.

AN ACT To prohibit aliens from fishing in the waters of Alaska.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall be unlawful for any person not a citizen of the United States, or who has declared his intention to become a citizen of the United States, and is not a bona fide resident therein, or for any company, corporation, or association not organized or authorized to transact business under the laws of the United States or under the laws of any State, Territory, or district thereof, or for any person not a native of Alaska, to catch or kill, or attempt to catch or kill, except with rod, spear, or gaff, any fish of any kind or species whatsoever in any of the waters of Alaska under the jurisdiction of the United States: *Provided, however,* That nothing contained in this Act shall prevent those lawfully taking fish in the said waters from selling the same, fresh or cured, in Alaska or in Alaskan waters, to any alien person, company, or vessel then being lawfully in said waters: *And provided further,* That nothing contained in this Act shall prevent any person, firm, corporation, or association lawfully entitled to fish in the waters of Alaska from employing as laborers any aliens who can now be lawfully employed under the existing laws of the United States, either at stated wages or by piecework, or both, in connection with Alaskan fisheries, or with the canning, salting or otherwise preserving of fish.

SEC. 2. That every person, company, corporation, or association found guilty of a violation of any provision of this Act or of any regulation made thereunder shall, for each offense, be fined not less than one hundred dollars nor more than five hundred dollars, which fine shall be a lien against any vessel or other property of the offending party or which was used in the commission of such unlawful act. Every vessel used or employed in violation of any provision of this Act or of any regulation made thereunder shall be liable to a fine of not less than one hundred dollars nor more than five hundred dollars, and may be seized and proceeded against by way of libel in any court having jurisdiction of the offense.

SEC. 3. That the violation of any provision of this Act or of any regulation made thereunder may be prosecuted in any United States district court of Alaska, California, Oregon, or Washington.

SEC. 4. That the collector of customs of the district of Alaska is hereby authorized to search and seize every foreign vessel and arrest every person violating any provision of this Act or any regulation made thereunder, and the Secretary of Commerce and Labor shall have power to authorize officers of the Navy and of the Revenue-Cutter Service and agents of the Department of Commerce and Labor to likewise make such searches, seizures, and arrests. If any foreign vessel shall be found within the waters to which this Act applies, having on board fresh or cured fish and apparatus or imple-

ments suitable for killing or taking fish, it shall be presumed that the vessel and apparatus were used in violation of this Act until it is otherwise sufficiently proved. And every vessel, its tackle, apparatus, or implements so seized shall be given into the custody of the United States marshal of either of the districts mentioned in section three of this Act, and shall be held by him subject to the proceedings provided for in section two of this Act. The facts in connection with such seizure shall be at once reported to the United States district attorney for the district to which the vessel so seized shall be taken, whose duty it shall be to institute the proper proceedings.

Sec. 5. That the Secretary of Commerce and Labor shall have power to make rules and regulations not inconsistent with law to carry into effect the provisions of this Act. And it shall be the duty of the Secretary of Commerce and Labor to enforce the provisions of this Act and the rules and regulations made thereunder, and for that purpose he may employ, through the Secretary of the Treasury and the Secretary of the Navy, the vessels of the United States Revenue-Cutter Service and of the Navy: *Provided, however,* That nothing contained in this Act shall be construed as affecting any existing treaty or convention between the United States and any foreign power.

Approved, June 14, 1906.

FISHERY REGULATIONS.

1. During the inspection of the salmon fisheries by the agents and representatives of this Department, they shall have at all times free and unobstructed access to all canneries, salteries, and other fishing establishments, and to all hatcheries.

2. All persons, companies, or corporations owning, operating, or using any trap-net, pound-net, or fish-wheel for taking salmon or other fishes shall cause to be placed in a conspicuous place on said trap-net, pound-net, or fish-wheel the name of the person, company, or corporation owning, operating, or using same, together with a distinctive number, letter, or name which shall identify each particular trap-net, pound-net, or fish-wheel, said lettering and numbering to consist of black figures and letters, not less than six inches in length, painted on white ground.

3. All persons, companies, or corporations engaged in canning salmon shall forward to the Bureau of Fisheries, Department of Commerce and Labor, Washington, D. C., three copies of each and every different can label which it is designed to place upon the canned product.

Charles Nagel, *Secretary.*

REGULATIONS FOR THE PROTECTION OF FUR-BEARING ANIMALS IN ALASKA.

[Alaska Fisheries Service—Circular No. 1.[a]]

March 8, 1911.

To whom it may concern:

Section 4 of "An act to protect the seal fisheries of Alaska, and for other purposes," approved April 21, 1910, provides that—

No person shall kill any otter, mink, marten, sable, or fur seal, or other fur-bearing animal, within the limits of Alaska Territory or in the waters thereof; and every person guilty thereof shall, for each offense, be fined not less than two hundred nor more than one thousand dollars or imprisoned not more than six months, or both; and all vessels, their tackle, apparel, furniture, and cargo found engaged in violation of this section shall be forfeited; but the Secretary of Commerce and Labor shall have power to authorize the killing of any such mink, marten, sable, fur seal, or other

[a] The sundry civil bill passed by Congress March 4, 1911, provided for a reorganization and expansion of the Alaska service of the Bureau of Fisheries, as referred to on page 65 of this report. This circular, while by its date not strictly within the scope of the report for 1910, is printed here for its usefulness in connection with the other laws now administered by the Alaska fisheries service.

fur-bearing animal under such regulations as he may prescribe; and it shall be the duty of the Secretary of Commerce and Labor to prevent the killing of any fur seal except as authorized by law and to provide for the execution of the provisions of this section until it is otherwise provided by law.

Fur-bearing animals enumerated below may, subject to the provisions of regulation No. 12, be hunted and killed in the Territory of Alaska, except during the seasons specified with respect to each of the several animals mentioned.

1. *Sea otter.*—The hunting or killing of sea otter is prohibited until November 1, 1920.

2. *Beaver.*—The hunting or killing of beaver is prohibited prior to November 1, 1915.

3. *Land otter and mink.*—The hunting or killing of land otter or mink is prohibited throughout the season from April 1 to November 15, both days inclusive, of each year.

4. *Marten, fisher, sable, ermine, and weasel.*—The hunting or killing of marten, fisher, sable, ermine, or weasel is prohibited throughout the season from April 1 to November 15, both days inclusive, of each year.

5. *Muskrat.*—The hunting or killing of muskrat is prohibited throughout the season from May 16 to November 30, both days inclusive, of each year.

6. *Black bear.*—The hunting or killing of black bear is prohibited throughout the season from June 1 to August 31, both days inclusive, of each year.

7. *Fox, lynx, and wildcat.*—The hunting or killing of fox, lynx, or wildcat is prohibited throughout the season from March 1 to November 15, both days inclusive, of each year.

8. *Wolf, wolverine, spermophile, and rabbit or hare.*—The killing of wolves, wolverines, spermophiles (ground squirrels), and rabbits or hares is not prohibited.

9. The killing of any fur-bearing animal by means of strychnine or any other poison is prohibited at all times.

10. Permits or licenses may be issued by the Secretary of Commerce and Labor for the taking of fur-bearing animals for scientific purposes, for shipment to zoological parks, or for breeding purposes.

11. The penalties and forfeitures imposed by the act will be strictly enforced against all persons who take, capture, or kill, or attempt to take, capture, or kill, any fur-bearing animal in the Territory of Alaska during the prohibited seasons herein established, or who barter or have in their possession the skin or pelt of any fur-bearing animal taken in the close or prohibited season.

12. Shipments of furs, which may be made at any time, will be reported to the Bureau of Fisheries, Department of Commerce and Labor, on appropriate blanks which will be supplied for that purpose.

These regulations supersede all others previously in force.

Approved:

CHARLES NAGEL, *Secretary.*

SPECIAL INVESTIGATION OF THE ALASKA FUR-SEAL ROOKERIES, 1910

By Harold Heath

Professor of Invertebrate Zoology, Stanford University

Bureau of Fisheries Document No. 748

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SPECIAL INVESTIGATION OF THE ALASKA FUR-SEAL ROOKERIES, 1910.

By Harold Heath,
Professor of Invertebrate Zoology, Stanford University.

Under the act of Congress of April 21, 1910, involving various changes in the administration of the Pribilof Islands and the seal fisheries and providing for the appointment of additional officers and employees, it was decided that a naturalist should be designated to study and report upon the condition of the seal herd. Pending the selection of a permanent occupant of this position, to take effect July 1 under the law, the writer was sent to the islands as a special investigator to perform the naturalist's duties for the season which was already beginning. Observations were made on St. Paul Island, beginning June 29, the date of arrival on the island, and continuing until July 15, then for a week on St. George Island, and again on St. Paul until August 29. A report of these observations is contained in the following pages.

I am indebted to the Government agents on the islands and to the officers of the revenue fleet for valuable data and many courtesies in connection with my work.

BRIEF SKETCH OF NATURAL HISTORY OF THE SEAL.

As popularly applied the term "seal" includes a fairly large group of aquatic mammals, such as the sea lion and the fur and hair seals, all of which bear a superficial resemblance to each other. Strictly speaking, the last named are the only ones deserving of the name. Unlike the hair seal, the fur seal, or sea bear, is able to progress readily on land, is able to hold its head erect, and its fore limbs, finlike in form, are used in swimming. Concerning its life at sea, we know that the seals of the Pribilof Islands spend their winter months along the western coast of North America, the adult females extending their migrations as far as southern California. Early in May the adult males or bulls begin to appear on the rookeries, where each is subsequently joined by 30 females on the average, the height of the

breeding season occurring about the 15th of July. Shortly after her arrival each cow gives birth to a pup, and after a sojourn of perhaps two weeks, during which time she is served by the bull, she puts out to sea on the first of several journeys in search of food.

During this time the young males or bachelors are arriving, and are usually found in groups on the outskirts of the rookeries. It is from these young males that the land catch of skins is made.

Early in August disorganization of the harems commences. The greater number of cows have been served, the active bulls accordingly relax their vigilance, the idle bulls and those less mature wander about without serious molestation, the pups congregate at various points on shore or in the shallows, where they learn to swim, and as autumn advances the roving instinct becomes more and more apparent in all classes, finally leading to the abandonment of the shore early in November.

THE ROOKERIES.

In position and extent the rookeries have undergone but few changes since last year. The number of active bulls and the attendant harems have decreased slightly, but whether this indicates an actual decrease in the number of cows is doubtful, since the count of pups, as noted in a succeeding section, was made on one rookery only and the data derived therefrom are not perfectly trustworthy. The decline in the number of harems on St. Paul is most apparent on Gorbatch, the Zapadnis, and Tolstoi, where there are 55 less than in 1909. On the other hand, there are 47 more on the Reef, Kitovi, Polovina, and Vostochni. On St. George the very slight increase noted on Staraya Artel and Zapadni is almost exactly counterbalanced by a decline on North and East rookeries.

This year the fleet operated chiefly about Northeast Point and to the south and east between St. Paul and St. George, but the results of their operations do not appear to be so distinctly reflected in a corresponding decline of adjacent rookeries as in 1909. Such a definite effect requires that the seals put out to sea along radii centering in either one of the islands, but on numerous occasions I have watched cows, and especially bachelors, leaving the rookeries, and their course is far from being either direct or uniform. The problem, however, is of interest chiefly to the naturalist as matters rest at present, and is without any very practical bearing on the conservation of the herd.

ROOKERY DEVELOPMENT.

At present there appear to be no very definite problems associated with the development of the rookery, but following the custom observed for several years past counts of harems and cows were made whenever and wherever it was possible. Kitovi especially received

attention and as far as practicable was examined at intervals of about three days with the following results:

DEVELOPMENT OF KITOVI ROOKERY, SEASON OF 1910, AS SHOWN BY COUNTS OF SEALS ON DIFFERENT DATES.

Date.	Harems.	Cows.	Reserve bulls.	Half bulls.
June 30	16	27	37	6
July 2	32	107	24	14
July 6	43	326	19	7
July 9	47	500	14	10
July 13	62	929	9	10

The past winter was unusually severe and long continued, delaying the breaking up of the drift ice, the melting of the snow, and the appearance of flowering plants for upward of three weeks. It is interesting to note, however, that this delay did not affect the summer resident birds, which put in an appearance at the customary time, though compelled in numerous instances to deposit their eggs on the snow. Nor did it hinder the migration of the seals, though several cows likewise took up positions on snow drifts, where they and the pups appeared to be unmindful of their unusual habitat.

HAREM COUNTS.

In accordance with the custom pursued in past years, the counts of harems were made as nearly as possible at the "height of the season," occurring July 12–16. Owing to stress of weather Sivutch, or Sea Lion Rock, rookery was not counted, but was estimated as containing 61 harems, the number found last season.

SUMMARY OF HAREM COUNTS, 1910, AND COMPARISON WITH 1897 AND 1909.[a]

Rookery.	1897	1909[a]	1910	Rookery.	1897	1909	1910
St. Paul Island:				St. George Island:			
Gorbatch	308	120	112	Little East	46	4	4
Ardiguen	33	11	11	East	128	65	59
Reef	454	184	206	Zapadni	133	43	47
Sea Lion Rock	102	61	61[b]	Staraya Artel	57	42	48
Kitovi	179	55	62	North	196	106	103
Lukanin	139	39	41				
Polovina	143	42	50	Total	560	260	261
Polovina Cliffs	61	23	20				
Little Polovina	40	19	12	Grand total	4,418	1,387	1,381
Morjovi	233	45	47				
Vostochni	910	184	204				
Zapadni	458	147	118				
Little Zapadni	176	62	54				
Zapadni Reef	114	11	7				
Tolstoi	295	87	77				
Tolstoi Cliffs	98	25	29				
Lagoon	115	12	9				
Total	3,858	1,127	1,120				

[a] Figures for 1909 are those of Mr. George A. Clark. [b] Estimated.

Assuming that Sea Lion Rock is occupied by the same number of harems as in 1909 or neglecting it for both seasons, there are 7 fewer harems on St. Paul this year than last.

Comparing the number of harems on St. George during the years 1909 and 1910 there is 1 more, and when both islands are considered 6 fewer. As there is one bull to a harem, this is another way only of stating that there are 6 fewer bulls this year than last; and obviously such an estimate affords no indication whatever of the actual number of breeding cows.

ACTIVE BULLS.

The number of active bulls, each in control of a harem, is as just noted, somewhat smaller this year than last (as 1,387 to 1,381); but it is the universal verdict that as a class they have lost none of those characteristics that make them successful masters. As usual there was considerable skirmishing among them as the harems were forming, but the wounds inflicted were comparatively insignificant and no deaths were recorded. Early in the season one dead female was found on Gorbatch whose wounds may have been caused by a bull, and later six cows were seen on various rookeries that had been severely though not fatally slashed.

In a few cases young bulls or "quitters" were found with harems on various rookeries, but usually they held sway on the outskirts of the community and joined the females in the mad rush to the sea whenever they were approached. It was the rare exception that they held a position in the more crowded portions of the rookery, where they would be called upon to defend their cows against the attempted inroads on the part of more seasoned harem masters.

By some authorities it has been urged that this infusion of young male life into the general herd is beneficial, but in all probability its value is overestimated. It is not disclaimed that some animals are born with more vigorous constitutions than others, and that in all probability their offspring will be more hardy in consequence. And furthermore, it is a truism that in the struggle for existence it is a gain that the feeble are weeded out; but this is an entirely different question from the one relating to the effects of age. In the case of the female a long existence may lessen the production of milk or alter its composition, and consequently inhibit the proper nourishment of the offspring, but with the male no such argument may be brought forward. In the case of the race horse, which has been studied as much as any other mammal, attempts have been made to show that it is desirable to breed young males, and again, with essentially the same data, such a position has been attacked. To-day we know far less about the seal, but it is a safe proposition to argue in favor of perpetuating, as far as possible, those fully developed males that are able to protect their harems.

IDLE BULLS.

These animals are victims of circumstances. Owing usually to an unfavorable location, they have failed to secure harems, though they are as physically able to control them as any of their class. Furthermore, the term "idle" is a misnomer, for no one who has watched them on the rookeries would ever accuse them of being sluggish. On the other hand, they are aggressive in the extreme, and especially during the height of the season engage in frequent quarrels with the harem masters, from whom they usually pilfer a small number of cows before the close of the season.

It can not well be doubted that an excess of this class of animals is more or less of a menace to the normal, or at all events what appears to be the most successful, type of seal existence. Claims have been made to the effect that for untold ages the seal has fought the battle of life successfully and that in the present time the hand of man is not required to control his destinies. The first part of this statement is undeniably correct, but the last is open to criticism, for it assumes that the seal is to-day leading a normal existence. Unfortunately this is not true, for we know that the number of breeding cows is becoming alarmingly reduced. In the open Pacific the number of captured males and females may be approximately equal, but the Bering Sea catch, as past records show, contains from 70 to 80 per cent of females. Since, on the average, there is 1 male to every 30 cows in the harem, there must inevitably result an excess of males, an unnatural state of affairs, and the belief that in cutting down this excess we are conferring a benefit appears to rest on a firm foundation.

This season the number of idle bulls was 221, not so great a number but that they were kept at bay until the disintegration of the harems had commenced, when they usually became the possessors of a small number of cows.

YOUNG BULLS.

Young bulls, otherwise known on the islands as "quitters", are usually 6 or 7 years old, and at the approach of man retire. They frequently haul out with the bachelors or form a shifting fringe about the group of breeding seals. In rare cases they controlled harems, usually on the margins of the rookeries, and in a few cases were seen in the act of copulation.

An accurate count of these animals was not made, unfortunately, since a considerable number had hauled out with the bachelors and could not be numbered without interfering with subsequent drives. At the height of the season the number on the rookeries was 184, and at various times 386 in all were included in the drives. Some were doubtless driven more than once, but it seems certain that the

actual number was at least 200, giving a total of 384. As the average life of the male is 13 years, of which 5 are spent as harem master, the decrease annually of the present active list is 276. It is apparent therefore that killing in the past has not been too close, and that there is a sufficient reserve at the present time.

COUNTS OF IDLE AND YOUNG BULLS.

The following count of idle and young bulls was made at the time the census of harems was taken. It was not possible without causing undue disturbance to enumerate members of the latter class that had hauled out with the bachelors on four important rookeries—Northeast Point, Gorbatch, the Reef, and Tolstoi.

Counts of Idle and Young Bulls on St. Paul and St. George Islands, 1910.

Rookery.	Idle bulls.	Young bulls.	Rookery.	Idle bulls.	Young bulls.
St. Paul Island:			St. Paul Island—Continued.		
Gorbatch	12	17	Tolstoi Cliffs	5	1
Ardiguen	1	....	Lagoon	3	....
Reef	28	17			
Kitovi	9	9	Total	144	136
Lukanin	5	11			
Polovina	5	12	St. George Island:		
Polovina Cliffs	5	5	East	20	....
Little Polovina	2	7	Zapadni	19	17
Morjovi	1	1	Staraya Artel	17	21
Vostochni	29	26	North	21	10
Zapadni	22	13			
Little Zapadni	10	8	Total	77	48
Zapadni Reef	....	3			
Tolstoi	7	6	Grand total	221	184

BREEDING COWS.

While there is a steady increase in the number of cows hauling out on any rookery for a month after the middle of June, a seagoing stream soon makes its appearance, consisting of cows en route to the feeding grounds after their pups are born. Hence at the "height of the season," about the middle of July, the number of cows on the beach is no true indication of the total number, nor does it always bear a constant ratio to the whole. Under certain circumstances, possibly due to climatic conditions, nearly the full complement may be present at the height of the season, and again in other years not over 30 per cent of the community may be on the rookery. It thus becomes apparent that such counts, of varying character from season to season, must be used with extreme caution, if at all, in estimating the entire number of females on any rookery or the annual decline or increase. As has been pointed out by others, we may arrive at an approximate estimate only by a count of the pups, and under that heading an attempt has been made to show that even here we must use the results with the greatest care in making a census of the herd.

During the height of the season counts were made on the following rookeries:

COUNTS OF COWS ON SOME ST. PAUL ROOKERIES DURING HEIGHT OF SEASON, 1897, 1909, AND 1910.

Rookery.	1897	1909 [a]	1910
Lagoon	1,319	281	229
Tolstoi Cliffs	1,286	698	646
Zapadni Reef	1,049	137	78
Ardiguen	470	207	218
Kitovi	2,436	892	837
Kitovi Amphitheater	654	127	92
Lukanin	....	....	820
Polovina Cliffs	....	....	426
Little Polovina	....	....	421
	7,214	2,342	3,767

[a] Counts of Mr. George A. Clark.

COUNTS OF PUPS.

Owing to the fact that all the cows are never present on the rookeries at a given time, it is obvious that the only approach to an accurate census of the breeding females is to be made by counting all the pups on all the rookeries. Such a procedure is not only arduous but wasteful, since the cows in early August, when the counting is usually done, are readily driven into the sea and a portion must inevitably fall a prey to the pelagic sealer. Accordingly it was the custom, for several years prior to 1906, to count the pups on a number of rookeries, and with such data estimate the entire herd. In more recent times the number of such pup counts has become gradually lessened until this year Kitovi was the only rookery examined, with the following result: Total number of pups, 1,966; dead, 62.

The implication that Kitovi is a typical average rookery must rest upon the assumption that it stands between those in which the decline is great and those in which it is at a minimum. As a matter of fact, an examination of the counts of Kitovi during the past four years shows that in reality it has been remarkably constant so far as the cows are concerned. Commencing with 1907 the number of pups each year is 1,959, 1,960, 1,979, and this year there are 1,966.

Last year there were 55 active bulls on Kitovi and 1,979 pups; this year there are 62 bulls and 1,966 pups. The average harem last year was 36; this year, 31.7; a difference due almost wholly to the increased number of active bulls. And, furthermore, this slight difference is of far-reaching importance when we come to consider the application of these data to the estimate of the entire herd. With 1,381 harems, each numbering 36 cows, the estimate would be 49,716; if each comprised 31.7 cows there are then 43,777 in the breeding herd, a difference of 5,939, or 11,878 when the pups are included in the count, due solely to the presence of 7 active, extra bulls.

Then, again, on the other rookeries an increase or decrease in the number of active males produces a corresponding rise or fall in the estimated number of cows. For example, on Vostochni there may be 6,500 cows and 200 active bulls. If 20 idle bulls, before the height of the season, secure 1 cow apiece, they enter the active list, and there are then 220 harems. As the average harem is 31.7, this increase affects the estimate to the extent of a gain of 634 cows, though in reality the number of cows has remained constant. At present this gain or loss in the active bull list outside of Kitovi is of relative unimportance, but it is conceivable that under certain circumstances it may assume a more prominent rôle.

I have in mind the fact that in treating this phase of the problem we are, after all, dealing in generalities, but the results may become so general that they have little actual value. In my opinion it is highly desirable that a pup count on all of the rookeries be made during August, or even early in September, in stress of weather, or possibly after the sealing fleet has left Bering Sea; and again a similar survey should be made five years later, when the typical rookery could be determined and questions relating to the increase or decrease of the herd be settled beyond a reasonable doubt.

ESTIMATES OF COWS AND PUPS.

Assuming that the average harem comprises 31.7 cows, the total number in the entire seal herd is computed in the following table:

COMPUTATION OF COWS AND PUPS ON ST. PAUL AND ST. GEORGE ISLANDS, 1897, 1909, AND 1910.

Rookery.	1897	1909 [a]	1910
St. Paul Island:			
Gorbatch	9,086	4,320	3,551
Ardiguen	736	355	349
Reef	13,393	6,624	6,530
Sea Lion Rock	3,009	2,196	[b] 1,934
Kitovi	5,289	1,979	1,966
Lukanin	4,100	1,404	1,299
Polovina	4,218	1,512	1,585
Polovina Cliffs	2,200	828	634
Little Polovina	1,180	684	380
Morjovi	6,873	1,620	1,490
Zapadni	13,511	5,292	3,740
Vostochni	26,845	6,624	6,467
Little Zapadni	5,192	2,232	1,711
Zapadni Reef	3,041	319	222
Tolstoi	8,702	3,132	2,471
St. Paul Island—Contd.			
Tolstoi Cliffs	2,891	1,452	888
Lagoon	2,598	693	285
Total	112,023	41,266	35,502
St. George Island:			
Little East	1,190	144	127
East	3,776	2,340	1,870
Zapadni	3,923	1,548	1,490
Staraya Artel	1,681	1,512	1,522
North	5,782	3,816	3,266
Total	16,342	9,360	8,275
Grand total	128,365	50,626	43,777

[a] Estimates of Mr. George A. Clark. [b] Estimated.

In the above census it is to be remembered that the totals apply to cows and pups and that both together number 87,554 in 1910.

YEARLINGS AND 2-YEAR-OLDS.

Of the various computations necessary to arrive at an estimate of the entire seal herd those concerned with the 2-year-olds and yearlings are the least satisfactory. And yet by restricting the quota of skins taken to 3-year-olds we could in a relatively short period arrive at a fairly close approximation, and at the same time settle other vexed questions that are in need of solution. At the present time we are compelled to base our estimates largely on the quota and those males dismissed from the killing grounds.

In the quota this year 10,210 skins weighed less than 7 pounds each, and 2,603 males were dismissed from the drives because they were undersized. Some of the latter were doubtless driven more than once, but even so it is probable that the number was not less than 1,800. Besides these, 337 2-year-olds were branded early in the season. This accounts for 12,347. That there are yet others is evidenced by the fact that fully 700 bachelors of killable size appeared on the hauling grounds of both islands in early August after the killing season, in addition to which there were probably other young animals in considerable numbers, though how many is uncertain. And it is probable, also, that some were at sea, but here again we have no exact information. A conservative estimate of 2-year-old males is therefore 13,000, which is also the number of virgin 2-year-old females that during the late summer arrived at the rookeries.

It appears to be the general belief that in 1909 there were 12,000 yearlings of each sex, and judging from estimates based on pup counts and the quota, the herd appears to have been stationary for the past three or four years. Hence we might suppose that the number of yearlings for this year is approximately the same as last. However, it is possible that the estimates based largely on Kitovi are misleading and that the quota was maintained by closer and closer killing. Future observations alone will settle this question. In order to be on the safe side we may assume that a shrinkage of 10 per cent has taken place and that accordingly the number of yearlings of each sex for the year 1910 is 10,800.

THE RESERVE.

For six years prior to 1910 two thousand 2 and 3 year old males were reserved annually, but as the brand, made by clipping the hair on the head, was not permanent, we have no means of knowing how many of these were subsequently killed. If 1,000 were actually exempted each year and there is an annual mortality of 10 per cent there should be between 500 and 600 this year remaining of the reserve of 1905. And if the decline of the present number of active bulls is approximately 300 there should this year be an increase of

over 200. As a matter of fact there is a slight decline, so that it appears that males exempted one year were killed the next. In reality, if we may judge from the records of past years, there is no necessity of reserving annually a number greater than one-half of the total number of active bulls, but these should be chosen from the class that will be wigged next year, or branded with a permanent mark.

This year 1,271 males were set aside as a reserve. Very nearly 1,000 4-year-olds and older were dismissed from the drives. Some of these were doubtless driven more than once, but it is assuredly safe to conclude that 600 were actually present. In addition there were others on the water front and in the water to the number of at least 100, and finally there were 605 idle and half bulls. This gives a total of 2,576, a number considerably in excess of the requirements.

ESTIMATE OF ALL CLASSES.

The following is an itemized estimated census of the seals forming the herd in 1910:

ESTIMATED CENSUS OF SEAL HERD IN 1910.

Class.	1910
Active bulls	1,381
Breeding cows	43,777
Pups	43,777
Idle bulls	221
Young bulls	384
Bachelor reserve	1,971
2-year males	5,500
2-year females	13,000
Yearling males	10,800
Yearling females	10,800
Quota killed	13,584
Total	145,195

According to this estimate and Mr. Clark's estimate of 158,488 for 1909, the herd has diminished by 13,293 within the past year. Whether this is a just conclusion must be decided by computations to be made during the next few years. Accuracy is impossible so long as the present methods are employed. During late years it has been assumed that the error is not greater than 12 per cent, and this is probably a fair conclusion. Last year the herd numbered between 150,000 and 160,000; this year it seems to fall between 140,000 and 150,000.

THE QUOTA.

In 1897 it was estimated that the ratio of bachelors to the entire herd was 1:20; this year it is approximately 1:10. The conditions that have brought about this change are matters largely of conjecture, for our knowledge of the seal is too imperfect to warrant a satisfactory explanation. It is reasonably certain that the mortality among pups is less than formerly and, as Mr. Lembkey states in his report of 1909, this would insure a proportionately larger return of yearlings, males and females, and subsequently of breeding cows, both of which are factors tending to the increase of bachelors. Then again the death rate of the young, estimated to be 50 per cent during the first year, may have been excessive and the proportion of bachelors to the the entire herd may have been greater than was estimated in 1897. But even if these problems were solved to our complete satisfaction they do not bear directly on the question of the conservation of the herd. As noted in another paragraph, the essential point to be settled is regarding the reserve. If it is sufficient to supply the requisite number of males, as the active ones disappear, then it appears to be the best policy to kill those remaining. The herd is declining or at best stationary. The pelagic sealer is hovering about the islands and close killing diminishes his catch. That the quota should consist of the skins of 3-year-olds is obviously the most economical plan, but from a purely zoological standpoint this is a matter of detail and relatively unimportant.

This year 10,749 skins were taken on St. Paul and 2,834 on St. George, a total of 13,583, or 785 less than in 1909. The weights of these, together with data relating to the drives and numbers dismissed, are given in the report of the agent in charge.

CONSERVATION AND SOME INVOLVED PROBLEMS.

It has been seen from the foregoing paragraphs that the number of males for breeding purposes is sufficient, and this has been so for many years. On the other hand the number of females has been decreasing steadily, and there is no question but that the pelagic sealer is, and has been, an important factor in producing this decline. Furthermore, another fact is evident, that with the conservation of the females on land and the setting aside annually of a sufficient male reserve no additional care will add one jot or tittle to the number of cows. It is perfectly true that the elements involved in the problem of the male reserve are intricate and some are not clearly understood, but in the last analysis the important question to be answered is this: Is there a sufficient number of males to take the place of those active on the rookeries? and every year the answer has been in the affirmative. On land, killing may be close, and skins below the

maximum value may be taken, but if the females are protected and the male reserve be adequate other questions sink into a position of relative unimportance as the seal problem now presents itself.

The foregoing paragraph is written from a purely biological standpoint, having in mind only the conservation of the herd, but there are other questions of a more practical bearing that should be settled before the sealing business can be conducted on the most economical basis. In the first place it is highly desirable that the number of pups born annually be more accurately determined, reducing the possible error below 10,000, where it stands at present. In 1896 the error was estimated to be about 6 per cent, but last year and this it is probably twice as great. With the herd approaching the vanishing point accuracy is more than ever a desideratum and should be had even at the cost of an unusual amount of labor.

Again, we have no information, within narrow limits, of the number of males or females returning at the close of the first year, or if this be beyond computation, then of the number returning the second or even the third year. This, as the sexes are of approximately equal numbers, will give more nearly than any other practicable method the number of females taking their places on the rookeries. Beyond this time observations should be made to determine the number of reserved 3-year-olds that appear the next year, and finally the percentage that ultimately becomes active on the rookeries. From such observations the reserve of males may ultimately be made with an accurate knowledge of facts, and not with such hazy ideas as we have at present.

It is highly desirable that the quota be taken from the males in prime condition, and I heartily agree with Mr. Lembkey and Mr. G. A. Clark, who argue in their reports of 1909 for the killing of 3-year-olds. I am by no means convinced that even by the branding of every pup, and so destroying the fur to some extent, we can, by this means alone, reduce the value of the skin to such a degree that the pelagic sealer will be forced out of business. It may indeed be a fact, but the brands made in the past were in some cases fatal and are supposedly about all that the young seal is able to survive, and yet not over one-tenth or at most one-eighth of the fur is destroyed. The resulting depreciation of value will probably not amount to more than $10, and two San Francisco furriers place it as low as $5. The price of skins is gradually advancing and on the other hand we do not know what returns will pay the schooner owners to keep a ship in the sea. The crew, averaging 35, receives $5 per man each month (Captain Quinan of the revenue cutter *Tahoma* says $2.50) and 12½ cents goes to each man for every skin taken by his particular rowboat. Let us suppose each schooner is out six months, and, judging from past records, 8,000 skins will be taken this year, or 320 per

schooner. If the price per skin were only $15 ($30 was the price they received last year) $4,800 would certainly be a paying investment.

On the other hand there is another factor making toward the reduction of the sealing fleet which, together with the partial destruction of the skins through branding, may possibly put the pelagic sealer out of business or, more probably, so limit the number of vessels that an equilibrium of the seal herd may become a fixed feature. This element is competition. With 25 schooners in the sea, rivalry must this year have been very keen, and with a diminishing herd some competitors must sooner or later leave the field. Any depreciation in the value of skins must hasten the desirable result, provided—and here an unknown factor enters—that the price of skins does not advance. But with the decline of the number of skins it is probable that prices will advance, and it appears very questionable whether branding and competition will drive away all of the pelagic fleet for many years to come. It may, however, make it possible for the herd to remain practically stationary until some form of treaty insures more perfect conservation.

The branding process may be made to include the male pups, but as the pelagic sealer secures but few bachelors this would greatly destroy the value of the land catch without giving adequate returns. It is possible that the males dismissed from the drives might be penned up for a month or so, but unfortunately I can not speak with authority regarding this plan, that was once put into execution several years ago. Some advocates claim that it is entirely possible; that after a few days the captives show no signs of restlessness in their unnatural surroundings. Others are equally certain that the experiment was not a success, as several of the larger animals broke through the barriers and some less fortunate became restless in the extreme and finally died of exhaustion. Furthermore, it is reported the bachelors ordinarily put to sea from time to time in search of food, and it is difficult to see how food would be forthcoming even if they desisted from their attempts to escape. The fact that placing animals in captivity would prevent redriving does not appear in itself to be sufficient reason for carrying out the plan. If by these schemes we hope to drive the pelagic sealer from his elected calling then it seems to me they will not succeed, but that they may increase the value of the land catch is possible.

THE QUESTION OF AN EQUILIBRIUM OF THE HERD.

The question of an equilibrium of the herd is one of very high importance. In 1897 the Fur Seal Commission agreed that such a state of affairs would ultimately occur, and in 1909 Mr. G. A. Clark argues in favor of the possibility that there is now an equilibrium.

Unfortunately, in the present year a sufficiently large pup count was not made whereby to settle the question. The estimated decline may be approximately correct or it may be due to the methods of taking the census. If an equilibrium does exist it means that if the number of guards stationed on the islands is sufficient to prevent poaching the entire land catch may amount annually to something in the neighborhood of 10,000 skins and the herd would be in no danger of extinction. If instead of allowing matters to rest as they are the Government orders the branding of female pups, then some of the pelagic sealers may be compelled to abandon their calling, and the herd would probably increase, but there is nothing to prevent the return of the entire sealing fleet when the herd is larger and a profitable catch may be made even though each skin is much reduced in value.

As matters appear there is one way only whereby the pelagic sealer may be driven away entirely, and that is by the further reduction of the seal herd. This is at best a cold-blooded proposition and will probably not meet with general approval, but there seems to be no other way to destroy the activity of the fleet.

The question now stands, Shall the pelagic sealer be driven from the sea and the financial gain from the then highly diminished herd be reduced to a minimum, or is it better policy to place the business more nearly on a paying basis though the pelagic sealer share in the returns? Until pelagic sealing is discontinued by an agreement with the countries concerned the revenue fleet must be kept about the islands, under any circumstances the natives must be cared for, and in various ways a heavy financial outlay must be made annually. Personally I favor the latter plan, reaping as large a harvest as is compatible with the conservation of the herd and at the same time leaving as little as possible to those on the high seas.

THE PATROL AND PELAGIC SEALING.

The revenue fleet maintained throughout the season of 1910 a most thoroughgoing and careful patrol about the islands, where reefs, and shifty currents, and impenetrable fogs are of the most treacherous character. Three cutters, the *Tahoma*, Capt. Quinan, commanding; the *Manning*, Capt. Cardin; and the *Perry*, Capt. Haake, constituted the fleet, with Capt. Foley at Unalaska in command. Prior to July 26 each vessel remained 12 days in the vicinity of St. Paul, and after 5 days returned from coaling at Unalaska. On the date named the *Perry*, during a dense fog, went ashore at Rocky Point on St. Paul and was never floated. The duties of the remaining vessels became correspondingly increased, but so far as known no schooner pushed inside of the 3-mile zone after this accident, and

generally speaking the infractions of the law throughout the season were of minor importance.

Pelagic sealing, on the part of the Japanese, continued with unabated vigor. During this season 25 vessels were reported, 7 more than in 1909, and the reports in Capt. Foley's office in Unalaska show that each schooner carried approximately 25 to 40 men and from 5 to 10 boats. Furthermore, several of these ships cleared from Japan early in the year, and, arriving at various points from California to Sitka, followed the herd to the breeding grounds in Bering Sea. In the vicinity of St. Paul Island, none ventured, so far as known, within the 3-mile zone, but in one or two instances violations were reported by the natives on St. George, where the revenue-cutter patrol is far less vigilant. On June 28 the *Tokai Maru* was seized and fined for violation of the alien fishing law, and on July 25 the *Toro Maru* was seized and fined for violation of the custom laws (section 2773 of the Revised Statutes). On July 18 two row boats were sighted in the vicinity of Zapadni, on St. George, so close to shore that one was seen to contain at least one unskinned seal. And again during foggy weather on July 30 two boats' crews from the schooner *Hoko Maru* landed at Northeast Point and Lukanin, respectively, and the next day 4 sailors from the *Toro Maru* were captured en route to Zapadni. Though pleading stress of weather, all were taken into custody and were subsequently tried in Unalaska.

Generally speaking, the fleet operated to the east and north of St. Paul, presumably in the path of the seals leaving the Reef, Kitovi, Lukanin, the Polovinas, and Northeast Point. On July 10 the steamer *Homer* reported at least a dozen schooners with their attendant boats, which had formed a great circle between St. Paul and St. George and were slaughtering the seals compelled to cross the line of fire at two points. Although the nearest of these vessels was at least 8 miles from the shores of St. Paul, the reports of the shotguns could be heard distinctly on land, and a count I made on that day from 11.20 to 11.50 a. m. showed that 228 shots were fired, an average of 7.6 per minute.

In this connection it may be mentioned that on certain days, owing to meteorological conditions, sounds travel amazing distances. According to Capt. Quinan, shots were heard one day in July seemingly well within the 3-mile zone, but with the lifting of the fog the nearest boat was fully 7 miles distant. Somewhat later in the month a fusilade was distinctly heard on St. Paul, but with the clearing away of the mists not a single boat could be detected even with powerful glasses used from the top of a 70-foot hill. It thus becomes apparent that alleged transgressions, based on this species of evidence alone, are far from being trustworthy.

To an outsider the practice of having Japanese stewards aboard the cutters is not above criticism. They must inevitably come into possession of valuable information that may be of service to Japanese prisoners, for whom they act as interpreters, if I am informed correctly. Furthermore, the Japanese detained for 10 days on St. Paul this year were in constant communication with the natives of the village, and it was no fault of theirs if they did not learn more of the island than is disclosed by the chart. One has a certain amount of sympathy for the pelagic sealer, who receives a mere pittance for his services and is the only sufferer when his boat is captured; but his imprisonment is not a serious hardship, especially if he be allowed to work on the coal pile at $2 per day and is ultimately sent back to Japan.

These are, after all, matters of comparative unimportance. The arrest, and even the severe punishment, of such offenders do not seriously interfere with the activities of the schooners and their owners. Such devices as branding to partially destroy the value of the skins, and of penning up male seals released from the drives, are not complete preventives, so that until an agreement is consummated the international struggle between watcher and watched must forever go on with all of the attendant aggravating features. It is possible that the herd is not in a state of equilibrium, but is actually diminishing. If this continue the hunter on the high seas must ultimately vanish from the scene of his pernicious activity; but is the Government of the United States compelled to place the seal herd on the altar of sacrifice in order to bring about this desired result?

If this, indeed, be true then we must decide, and that right early, whether this be a lesser evil than the other, hypothetical to a certain degree, of branding the females, which form the greater portion of the pelagic catch, and by the depreciation of their skins, making it necessary for a greater number than at present to be taken with profit by the pelagic sealer. At the same time this would render it possible for an increased number of cows to escape and breed on the rookeries, and so add materially to the bachelor herd and consequently to the land catch.

THE PELAGIC CATCH.

Regarding the pelagic catch of this year, our evidence must rest upon a very slender reed—the reports of the Japanese themselves. According to these, 4,213 skins were taken prior to August 15, of which 2,098 came from Bering Sea. Last year the reported Japanese catch up to August 15 was 4,954 skins. As a matter of fact, it was then probably twice as large, for the entire season's catch, as reported from the London market, was 10,561 skins. This year it is safe to predict that there will be at least 8,000.

COWS IN DRIVES.

During the killing season proper, closing August 1, the discipline maintained by the active bulls on the rookeries was very strict, and accordingly a very insignificant number of cows made their way into the neighborhood of the bachelors and were driven to the sealing grounds. Such as did so, of course, were subsequently released. During a food drive on August 10, when the harems had commenced to disintegrate, several cows appeared in the drive, but I was unable to find a single one among the dead on the killing grounds. Doubtless females may occasionally be clubbed accidentally, but this year I can testify that the greatest care was exercised, and I know of no occurrences of the kind.

FEEDING OF PUPS.

For various reasons, up to the time of my departure from the islands, no attempt was made to raise pups. The pair handled successfully by Boatswain Thurber had shed the first coat and were fully 3 months old; he was unsuccessful with the young, black pups. These last named may possibly be reared if food of the proper character be fed, but at the present time we are ignorant of the composition of seal's milk. In any event one must have not only a large store of patience but an abundance of time, and whatever may be said regarding the first requisite the latter is not forthcoming during the summer, when one is concerned with numerous other matters pertaining to the herd in general and must leave the islands in August.

CAUSES OF DEATH.

Under normal circumstances the life of the seal of either sex is probably from 12 to 13 years. Since the bulls are active for not more than five seasons, one-fifth of the active list dies each year, and as the cows are believed to breed during ten seasons one-tenth of their number disappears annually.

Judging from the reports of former years the season of 1910 was one of comparative quiet. No fatalities due to fighting were noted among the bulls, and only one cow was discovered whose death may be attributed to rough handling on the part of a bull.

On the killing grounds between 20 and 30 bachelors were found with from one to three buckshot imbedded in various parts of the body. Some of the resulting wounds were severe, but no deaths were directly traced to this cause.

In earlier times the ravages of the parasitic worm, *Uncinaria*, were especially noticeable on the Tolstoi sand flat and portions of Zapadni, but in recent years, due to the shrinkage of the herd, these areas have been abandoned. Very few cases were noted by Dr. Chichester

in 1909, and not one was detected this year. The dead pups dissected showed no lesions whatever, their emaciated appearance and empty alimentary canal indicating death from starvation.

AGES OF SEALS.

Last year 34 branded cows that had been marked as pups not later than 1902 were observed on the rookeries. This year 11 were seen prior to August 1, but during this time there is little opportunity to examine the cows critically, and later in the season such an examination would produce an unwarrantable disturbance on the rookeries. However, the fact is established that there are branded cows in existence, and the time of their disappearance and their possible age may be decided at a later date. It is interesting to note that two cows on St. George bore the T brand of 1899.

Practically every active bull on both islands was examined critically, but not a single brand was seen and none was reported by the government agents or the natives. The branded bull on Kitovi, which last year completed his fifth season, has disappeared. Another bull, blind in one eye, occupied a site on Kitovi for the third season. In other years bulls with scars or other distinguishable marks have been seen at various stations, but these have rarely continued on the active list for more than three or four seasons. It is therefore an established fact that under ordinary circumstances the male becomes active at 8 years of age and lives three or four years thereafter. The age of the female is not known with the same degree of certainty, but it is commonly believed that she lives to the same age.

APPENDIX—EXTRACT FROM FIELD NOTES.

Beginning early in August, the harems begin to show signs of disorganization; the majority of the cows have been served and are free to come or go without serious let or hindrance; the idle and half bulls roam about at will and the breeding season thus passes into its last stage. From this time on observations producing no unwonted disturbance are to be made only from some place of concealment, such as are supplied by the cliffs of Ardiguen or Lukanin. To these two spots I repaired practically every day in August, and for varying lengths of time watched the life of the seal herd. It is unnecessary to detail observations that have already been recorded by several students of the subject, but I may voice again the general verdict that such a show of mammalian life is to be met with nowhere else on the face of the earth, and from several points of view it would indeed be a calamity if the seal meets the fate of the manatee, the sea otter, or the buffalo.

Concerning other life on the islands, much has been said and much remains to be investigated. For many years the bird life has received the attention of the ornithologist and the more important phases of the problems involved have probably been settled; yet there are other matters of minor detail relating to stray migrants, nest materials, and construction and feeding that well deserve attention.

The insects of the islands are numerous and of all the animals or plants doubtless afford some of the most important and interesting problems, if not the very greatest, of purely scientific character remaining to be solved. Owing to the brevity of the summer season, some of the stages in the life history are completed in a surprisingly short space of time, and a comparison of the life histories of related insects in adjoining regions would be interesting to say the least. Furthermore, the conditions under which they survive the winter will also be an interesting chapter in the life of the island organisms.

The flowering plants have been the subject of much study, and it is doubtful if many novelties will be recorded in the future. To a less extent this is true of the lichens, but there are unquestionably small species that have escaped detection; and again there are modifications due to habitat that make it altogether possible that superficially similar forms may in reality be distinct species. Among the fungi there are certainly new forms. On some of the upland slopes in the early season I have found species that do not correspond to any described in the reports of the region.

It is highly desirable that a museum be installed on the islands, containing, so far as is practicable, specimens of all the animals and plants. And equally desirable is a library, comprising all works that in any way are concerned with the biology of the country.

Finally, one word relating to the natives. Considering their antecedents, and especially their former mode of life and lack of advantages, these people have made truly remarkable strides, and yet there is obviously room for improvement. By nature conservative, they are somewhat nonplastic, but at heart they are anxious to better their condition, and they do respond with comparative readiness to all uplifting influences. In matters relating to personal hygiene there is much to be desired, and, improved, their span of life will doubtless be lengthened to a very noticeable degree. And, again, it is highly desirable that during the long and confining winter both the men and women have something to occupy their time—something profitable and yet agreeable, and if possible with a resulting value in some larger community. It is difficult to decide what is best. Numerous plans have suggested themselves, but none of them are free from certain inherent difficulties, and I earnestly hope that those more competent may give the subject their serious consideration, for certainly this species of missionary work carries a rich reward.

In addition to the questions here outlined are others of deep import. Years ago Darwin called attention to the remarkable similarity of the animals on the Galapagos Islands to those on the western slope of South America, and on the basis of this likeness formulated his theory of evolution. Doubtless on the Pribilof Islands the same conditions exist when compared with others of the mainland. Extensive breeding experiments are being carried on in several sections of our country, but it is by no means certain that new species are created in the period measured by a man's life or even in a hundred years. On the islands, however, in a normal habitat, evolutionary agencies have doubtless made their influence felt, even though the islands are geologically young. It seems therefore wise to make extensive collections of the island fauna and flora, to study these critically, and, finally, to compare them with related species on the mainland. These results might be very interesting when considered in connection with the newly formed island of Bogoslof. On this body of land, forced above the sea within the memory of man, we already find plants thriving, and there are doubtless animals on the land or along the shore. Even if there are no visible differences between organisms on this island and those of the Aleutian chain, we may gain some insight into the means whereby their transportation has been accomplished, and if collections and careful notes are kept in the near future the evolutionary side of the subjects may be studied sometime in the years to come.

THE FUR-SEAL FISHERIES OF ALASKA IN 1910

By Walter I. Lembkey
Agent in Charge

Bureau of Fisheries Document No. 749

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THE NEW ADMINISTRATION.

With the passage of the act of April 21, 1910, the leasing system, which since 1870 had required that the sealing right on the Pribilof Islands be let in 20-year periods to the highest bidder, was abrogated. This new law neither suspended the killing of seals on the islands nor required it to be curtailed, but provided that such killing should be done only by the authority of the Secretary of Commerce and Labor through officers, agents, or employees of that Department, the natives to be employed to perform the labor necessary to secure the sealskins and to receive fair compensation for their labor. So also the sealskins taken under the authority and by the persons already mentioned should be sold by the Secretary to the best advantage of the Government.

By this act the Secretary of Commerce and Labor was given authority also to appoint such additional officers, agents, and employees as may be necessary to carry out the provisions of the act; to purchase at a fair valuation the plant of the former lessee on the islands; to establish and maintain supply depots on the Pribilof Islands; to provide for the transportation of supplies by the charter of vessels; and, finally, to furnish food, fuel, clothing, and other necessaries of life to the natives of the Pribilof Islands, and to provide for their comfort, maintenance, education, and protection.

INCREASED SCOPE OF AGENTS' DUTY.

This act placed upon the Department heavy responsibilities which hitherto had been borne by the lessee. The business of killing seals and curing the skins, the mercantile business with a stock of approximately $40,000 worth of goods, and, in short, all other practical affairs, were required to be actively managed by the Department agents, who previously had occupied the virtual status of inspectors of the lessee's operations, in addition to the duty of examination of the seal herd and the administration of the natives' affairs.

The act mentioned had not been approved by the President before those charged with the management of the seal fisheries were giving their attention to the working out of the details under the new con-

ditions. On May 9 the annual instructions to the agent in charge were signed; shortly afterwards $2,000 in cash was advanced to the agent to pay for labor on the islands other than that of killing seals, bonds being given by himself and assistant agents to insure the proper handling of this fund and the faithful performance of duties in general. On May 17 the agent in charge left Washington to begin the preparations for carrying out the requirements of the act of April 21, 1910.

HIRE OF VESSEL AND PURCHASE AND TRANSPORTATION OF SUPPLIES.

On May 21 the agent arrived in San Francisco and on the 26th a charter for the steamer *Homer* at $142.50 per diem was signed, subject to the approval of the Department of Commerce and Labor. This vessel was delivered under the charter June 1, and was sent first to the coal bunkers to receive her fuel and cargo coal and thence to the covered dock of the Cosmos Line to receive freight.

After the charter of the *Homer* was completed, the purchase of supplies for the natives and the islands in general was next to be taken up. It was found at once that the best prices on the goods required could not be obtained without inviting competitive bids; consequently, with the assistance of the North American Commercial Company, the retiring lessee, which placed its annual requisitions at the Department's disposal, schedules of the principal classes of merchandise were prepared in triplicate and presented to three of the largest mercantile firms in the several lines of business, with the request that each submit a bid in writing. All merchandise, with the exception of small articles of miscellaneous classification, was thus purchased from the lowest bidder, after a careful inspection of the goods to determine whether the quality as well as the price was satisfactory.

It was necessary to visit in person the place of business of each firm to solicit these bids; to go again to make purchases, and again to deliver the vouchers in payment of the articles purchased. With this and the attendant clerical work, it is considered that no time was wasted in the preparations incident to the sailing of the supply ship for the islands.

During the period from June 1 to 10, the supplies were purchased and the vessel loaded. On June 11 the *Homer* sailed from San Francisco, arriving at Dutch Harbor June 24. Coaling there, she proceeded to the islands, arriving at St. George June 27 and St. Paul June 29. Having discharged all freight, she left on July 1 for Dutch Harbor to load coal for the natives' use. Delivering this coal on July 7–11, she returned to San Francisco July 23.

Taking on another cargo of merchandise, together with coal enough for the round trip to the islands, the *Homer* again left San Francisco

August 6, arriving at Dutch Harbor August 21, at St. George the 23d, and St. Paul the 24th. Having received the sealskins aboard, she left St. Paul August 28 and arrived back at San Francisco September 12.

The sealskins were taken at once to Oakland Long Wharf, where, carefully packed in casks and placed in ventilated freight cars, they left on the night of September 14 for New York and thence were shipped to London to be sold at public auction.

EMPLOYEES.

It has already been stated that during the continuance of the leases of the two companies the Government agents on the islands were not concerned with the active management of business, but acted with regard to it merely as inspectors. This does not refer to the supervision of the natives' affairs, the management of which was never the subject of concern by any of the lessee's employees. Under these circumstances the services of the four agents were ample to oversee properly the operations of the lessee and to perform such duties as might be required of the Government's representatives. With the taking over, however, of the business which heretofore formed the exclusive concern of the lessee, an increase in the number of the Government employees on the islands became necessary.

Special biological study of the seal herd having been decided upon, a naturalist was appointed for this work, Dr. Harold Heath, of Stanford University, accepting the position until permanent arrangements could be made. The selection of the additional employees and the assignment of their duties were left to the agent. Of the force required, it was considered advisable to retain as many of the employees of the late lessee as could be used, as these men were efficient, skilled in their duties, and required no instruction other than that necessary to acquaint them with new conditions.

During the summer the force of employees on the islands, in addition to the agents and the naturalist, was as follows:

Name.	Position.	Period.	Annual salary.
On St. Paul Island:			
A. H. Proctor	Storekeeper and bookkeeper	Indefinite	$1,800
S. Melovidof	School-teacher	do	1,200
H. C. Mills	Physician	Until fall	1,200
[Chinese]	Cook	Indefinite	720
N. Bogadanof	Stockman	do	300
[Selected natives]	Janitor Government house	do	240
Do	Janitor former company house	do	180
On St. George Island:			
James Murtha	Storekeeper	Until fall	1,200
C. M. Cunningham	Physician	do	1,200
Ned B. Campbell	School-teacher	Indefinite	900
[Chinese]	Cook	Until fall	720
M. Lestenkof	Stockman	Indefinite	300
[Selected natives]	Janitor Government house	do	240
Do	Janitor former company house	do	180

Mr. Proctor assumed his duties with the idea of serving during the winter on St. Paul. Subsequently, by an order of Secretary Nagel, made during the Secretary's visit to St. Paul, Mr. Proctor was transferred to St. George as acting assistant agent, in place of Assistant Agent Clark, who returned to the Department. Dr. Mills served only during the summer, returning to his home at his own request. The Chinese cooks on both islands were relieved at their own request by others brought up from San Francisco. Assistant Agents James Judge and E. W. Clark with Agent Lembkey returned to the Department on the *Homer*.

Messrs. Murtha and Cunningham served only during the summer, as was contemplated when they were first appointed. Dr. Pedro de Figanière was sent up by the Department to take the place of Dr. Cunningham. Mr. Campbell was appointed by the Department. All others were appointed provisionally from the force on the islands.

During the ensuing winter the force of employees on the two islands will be as follows:

St. Paul: H. D. Chichester, assistant agent in charge; Walter L. Hahn, naturalist; Norman P. Morgan, physician; S. Melovidof, school-teacher; a Chinese cook; and N. Bogadanof, stockman.

St. George: A. H. Proctor, acting assistant agent; P. de Figanière, physician; Ned B. Campbell, school-teacher; a Chinese cook; and M. Lestenkof, stockman.

The respective assistant agents are performing their usual duties in addition to those heretofore devolving upon the lessee's agents. When it is considered also that the office force of the lessee in San Francisco, with over $20,000 in salaries, has been eliminated, it will be seen that the island service, while highly efficient, is conducted at a minimum of expenditure. No increase in administrative force has occurred. A bookkeeper, two physicians, and two school-teachers only have been added, in addition to cooks and miscellaneous native help.

TRANSFER OF LESSEE'S PROPERTY.

By a letter dated May 7, 1910, from the Commissioner of Fisheries, the agent was directed to confer with the North American Commercial Company and if possible to arrive at a fair and just valuation to be placed upon the property of that company on the Pribilof Islands, with a view to purchase by the Government.

Two days after arrival at San Francisco a conference was had with the company, at which a statement of the presumed value to the Government of the company's holdings on the islands was made. After consideration of the question the company several days later agreed to transfer the Pribilof Islands plant at the valuation proposed at the previous conference.

Upon arrival at the islands an inventory as of June 30 was taken. Later, the transaction having received the approval of Secretary

Nagel, who personally visited the islands and inspected the plant, vouchers were drawn to cover the various amounts shown on the inventory according to the basis of settlement proposed and accepted, and were transmitted to the Department for settlement.

A recapitulation of the inventories on the two islands, as taken on June 30, 1910, with a memorandum of the basis of settlement, follows:

ST. PAUL ISLAND.

Company's inventory.		Settlement price.		
Merchandise	$5,154.33	San Francisco invoice cost		$5,154.33
Tools and implements	3,522.83	50 per cent of inventory		1,761.41
Drugs and instruments	816.63	Inventory cost		816.63
Household furniture	2,957.22	25 per cent deducted from inventory		2,217.92
Dispensary furniture	159.97	Do		119.98
Boats and bidarras	3,835.40	Launch	$2,000	
		Boat	400	
		Do	275	
		3 bidarras, at $175 each	525	3,200.00
Telephone line	367.79	Lump sum		90.00
School supplies	276.29	Do		257.00
Company buildings	25,683.45	50 per cent of inventory		12,841.72
Native dwellings	17,269.11	Do		8,634.55
Sea-lion skins	138.00	Inventory cost		138.00
Live stock	967.62	Do		967.62
Salt and twine	1,260.02	Do		1,260.02
Fox skins (traps, etc)	61.88	Do		61.88
Library	1,012.86	Lump sum		200.00
Wharf ways and derrick	804.63	50 per cent of inventory		402.31
Coal, 66 tons 1,339 pounds, at $20	1,331.97	Same, at $17		1,132.17
Total	65,620.00	Total		39,255.54

ST. GEORGE ISLAND.

Merchandise	$6,352.03	San Francisco invoice cost	$6,352.00
Coal, 38 tons, at $20	760.00	Same, at $17	646.00
Dispensary	718.97	50 per cent of inventory	359.48
Live-stock account	313.72	Inventory cost	313.72
Groceries, company house mess	227.73	San Francisco invoice cost	227.73
Salt and seal twine	198.10	San Francisco invoice cost after inspection	198.10
Old salt	98.87	Do	98.87
Sea-lion skins	85.71	Inventory cost	85.71
Boats and bidarras	1,215.96	Lump sum	700.00
Company buildings	11,604.04	50 per cent	5,802.02
Derrick and landing (including cars and track)	1,737.23	Do	868.61
House and office furniture	2,043.63	25 per cent deduction	1,532.72
Library	670.64	Lump sum	100.00
Native dwellings	6,646.96	50 per cent	3,323.48
Telephone	297.25	Do	148.62
Tools and implements	1,164.47	Do	582.23
Total	34,135.31	Total	21,339.32

The foregoing lists represent a total valuation for both islands of $60,568.17. Subsequent deductions because of errors in addition, computation, etc., reduced this amount by $26.69. A final settlement was made by the Department for $60,541.48 and checks for that amount were transmitted to the company.

With the exception of the buildings, practically everything on the inventory represents new stock, purchased by the company during its lease and not acquired from the former lessee. With regard to the buildings it may be said that, although erected by the former lessee, they have been kept from deterioration by constant repair and could not be replaced for anything approaching the price paid for them by the Government. On St. George the company's

dwelling house and warehouses were virtually rebuilt by the late lessee, when also several new native dwellings were added. On St. Paul constant repairs were made to all the buildings during the period of the lease, and the buildings not only are habitable but efficient. When it is considered furthermore that only 50 per cent of the inventory valuation was paid for these buildings, it may be seen that the price was not excessive.

NATIVES' AFFAIRS.

Upon the agents' arrival at the islands considerable anxiety was found to have existed in the minds of the natives and others as to the time of arrival of the supply ship and the arrangements which might be made for the conduct of affairs under the changed conditions. Through the revenue cutters which touched at the islands previous to the arrival of the *Homer*, information had been received of the assumption of active management by the Government, but no intimation as to what efforts were being put forth by the Department for taking charge of the practical affairs. This anxiety had been heightened by the fact that the supply of some articles of necessity, as food on St. Paul, had been almost consumed. In fact, to provide against an imminent shortage it had become necessary in the early part of June to obtain by the revenue cutter *Manning* a quantity of flour, biscuits, salt beef, and canned vegetables from Dutch Harbor. In addition to this fear of impending famine, the natives had received the impression that they would be obliged to labor for the Government without any compensation other than clothing and food, as had been actually the case under the Russian régime.

The agents' first effort, therefore, was to allay these impressions and to establish relations of confidence with the natives, though, as a matter of fact, the arrival of a shipload of supplies and of a gunny sack containing about 150 pounds of coin had the effect automatically of removing the greater portion of this uncertainty. In addition, conferences were had with individual natives and with the assembled communities, in which the changes which had occurred during the past season were explained and assurance was given that the intention of the Government was to improve the present condition of the natives wherever possible rather than to make it less favorable than under the late lessee.

It was necessary specifically to reassure them that cash payments for sundry labor would be continued under the new management. This has been the source of almost all the cash received by the natives, and the loss of it the occasion of their chief anxiety. The assurance of the continuation of these payments in cash, together with the increase in the rate of payment for taking sealskins, and the material reduction in the prices at which merchandise is to be sold to the natives out of the stores on the islands, all had the effect of

restoring confidence and obtaining a renewal of the natives' good will.

Supply depot.—Immediately upon the arrival of the *Homer* all hands not entirely occupied with sealing began taking an inventory of merchandise and other property belonging to the company, with a view to its being taken over by the Government, in accordance with instructions contained in the letter to the agent in charge dated May 7, 1910. This inventory was prepared in time to be transmitted on the return of the *Homer* on her first trip.

After completing the inventory the merchandise which arrived on the *Homer* was uncrated and checked with the invoices. The price was marked on the articles at the rate fixed in the instructions of the agent, namely, a flat rate of 33⅓ per cent advance over San Francisco wholesale prices. The prices of those articles of merchandise also which were taken over from the company were made to conform to the prices fixed for the new invoices of goods.

The application of this flat rate of 33⅓ per cent advance had the result of selling merchandise to the natives at lower prices than ever before in the history of the islands. Because of high market prices in San Francisco at the time the spring requisition was purchased the retail price of butter was increased from 35 cents to 42 cents; flour remained the same, at $1.75 a quarter barrel; lard was raised from 18 cents to 21 cents a pound; rubber boots, from $6 to $6.35 a pair; canned beef from 30 cents to 35 cents each. Some few other articles were sold at the same rate as formerly; all other prices were reduced. A statement of some of these reduced prices follows:

Articles.	Former price.	Present price.
Apples:		
Canned	$0.25	$0.20
Evaporated	2 for .30	3 for .25
Apricots, canned	.25	.20
Arctics:		
Men's	2.25	1.90
Women's	1.50	1.35
Beans, canned	.20	.15
Bedspreads	2.25	1.70
Beef, salt	.12½	.09
Blackberries, canned	.25	.20
Blankets	7.00	5.50
Calico	.10	3 for .25
Candles	.02½	.02
Candy, 2 pounds	.50	.25
Chimneys, lamp	.15	2 for .15
Coffee	.25	.20
Collars, white	.25	2 for .25
Corn, canned	.20	.15
Crackers:		
Soda	.10	3 for .25
Sweet	.20	.15
Cups and saucers.........set	.20	.15
Dress goods	.60	.50
Ewers and basins.........set	2.00	1.25
Gingham	.15	2 for .25
Gloves, men's, wool	.50	.25
Knives, pocket	.40	.30
Jams	.25	.20
Jelly	.25	.20
Lining, cotton	.15	.12½
Milk, condensed	.25	.20
Needles	$0.05	2 for $0.05
Oil:		
Coal	.40	.26
Cottonseed	.35	.25
Onions	.06½	.05
Peaches, canned	.25	.20
Pears, canned	.25	.20
Peas	.20	.15
Potatoes	.03½	.02½
Baking powder	.20	.15
Prunes	.15	3 for .25
Raisins	.15	3 for .25
Rice	3 for .25	3 for .20
Worcestershire sauce, American	.25	.15
Shoes:		
Babies'	.75	.55
Do	1.25	.90
Boys'	3.00	2.00
Children's	2.50	1.75
Do	2.00	1.40
Men's	4.00	3.15
Misses'	2.50	1.75
Women's	3.00	2.35
Do	4.50	2.60
Swiss, dotted	.25	.15
Soap	.06¼	.05
Socks	.50	.45
Tea	.50	.25
Tobacco, leaf	.50	.40
Tomatoes, canned	.20	.15
Trousers	5.00	4.00

On every weekly order issued a saving of from 75 cents to $1.50 was made by reason of these reduced prices. In addition the price of coal was reduced from $20 a ton to $12.75 plus a small charge for stevedorage at either end. While no accurate computation has yet been made, it is believed that by reason of the reduced prices of commodities sold the purchasing power of the natives will be increased by several thousands of dollars.

Bank accounts.—When the Alaska Commercial Company in 1870 began taking seals under its lease, in addition to providing comfortable dwellings for the native inhabitants, it also endeavored to encourage thrift among them by receiving deposits of money from such natives as desired to open savings accounts. On these accounts, which were subject to check at all times, the company paid interest at the rate of 4 per cent on balances found on May 31 of each year. During the period of this company's lease some natives had accumulated accounts of over $2,000 each.

These accounts were taken over by the North American Commercial Company when it succeeded to the sealing privilege in 1890. While during the 20-year lease of the latter company these funds on deposit became smaller, due to the lessened amounts earned by the natives and to distribution to nonresident heirs upon death of the owner of the account, there still remained a few so-called bank accounts in the hands of the North American Commercial Company at the time of the expiration of its lease.

When the contract of the North American Commercial Company expired in 1910 these funds remained on deposit with it, and some action with reference thereto became necessary on the part of the Government, which then took over the active management of the business.

In the instructions dated May 9, 1910, it was directed that if the balance on the bank account of any native was small it should be paid by the company directly to the native; if, however, the native desired, it should be held by the company and deposited in a safe financial institution in San Francisco by the agent in charge as attorney in fact for the benefit of the native owning the account, the interest to be collected annually and paid directly to the native.

Upon arrival at the islands last spring the natives were informed of the situation and told that if they desired their money could be deposited in a bank in San Francisco previously selected, which would pay interest at the rate of $3\frac{1}{2}$ per cent per annum. They all assented to the redepositing of their funds in the manner stated.

Such small accounts as did not exceed $25 were paid to the owner in cash by the company; the accounts of larger amount than that stated were closed by the company's presenting the respective owners with drafts for the several amounts.

Each native who possessed one of these drafts delivered the same to W. I. Lembkey and upon blanks previously provided signed a power of attorney to him authorizing him to deposit the drafts with a bank in San Francisco, to collect the amount of any interest due thereon and to give receipts for the same.

A list of the accounts and the persons to whom they belong follows:

St. George Island:	
Fevronia Galanin	$40.00
Dimitri Lestenkof	137.00
Michael Lestenkof	240.00
Peter Prokopiof	83.55
Emanuel Zaharof	33.20
Zoya Swetzof	123.00
Mary Galanin	245.00
Michael Shane	63.55
Mary Philamonof	90.05
Total	1,055.35
St. Paul Island:	
Alexander Merculief	170.00
Nekita Hopof	50.00
Agrifina Bogadanof	161.10
Marina Stepetin	40.00
Apollon Bourdukofsky	203.30
Parascovia Kozlof	150.00
St. Paul Island—Continued.	
Peter Bourdukofsky	$130.00
Elizabeth Rookavishnikof	40.00
Agrifina Fratis	71.00
Agrifina S. Pankof	285.00
Peter Oustigof	140.00
Alexander Melovidof	235.00
Julia B. Krukof	170.00
Simeon Fratis	71.00
Akalina Fratis	426.00
Alexai Emanof	230.00
Tekan Volkof	966.00
Martha Fratis	71.00
John Hansen	370.00
Oulianna Fratis	71.00
Total	4,050.40
Grand total	5,105.75

The St. Paul drafts were deposited to the credit of W. I. Lembkey, trustee for the various natives. Separate accounts were opened with each fund and pass books provided to be delivered to each native owning the account. In cases where the money was owned by a minor child, the account was opened in the name of its natural guardian—either one of its parents, or if an orphan, the person with whom it resides—with Agent Lembkey as trustee for the guardian.

Upon taking the St. George drafts to the bank it was discovered that by an oversight they had not been indorsed by the persons in whose favor they were drawn. Unfortunately, therefore, they could not be deposited. An arrangement was made with the North American Commercial Company, however, whereby the amount of these St. George drafts, $1,055.35, was deposited by the company to protect the drafts which it will be necessary to take back to St. George Island for proper indorsement. After being so indorsed they will be paid by the bank and savings accounts opened with each of the persons named, in the same manner as the drafts from St. Paul.

The interest on these accounts will be collected annually and paid to the proper persons. The receipts for money so paid will be submitted with the annual report.

Resources of natives.—During the summer of 1910, from taking seals, and the previous winter from trappings foxes on St. George,

the natives of the islands earned the following amounts, to be applied to their support:

St. George:	
203 blue foxes, at $5; 9 white, at $1	$1,024
2,834 sealskins, at $1	2,834
St. Paul:	
664 sealskins, at 75 cents	498
10,088 sealskins, at $1	10,088
Total	14,444

As the fox skins were delivered to the North American Commercial Company, that company paid directly to the agent on St. George for the natives the amount of $1,024, due the natives on that account. The company also paid in cash to the agent on St. Paul the $498 due the natives from the 664 sealskins which the Department authorized the company to take to complete its quota of 15,000 for 1909. The amounts of $10,088 earned by the St. Paul natives and $2,834 earned by the St. George natives for taking the sealskins shipped on Government account in 1910 were credited to the natives on the island books. Payments of cash therefrom were not made except of small sums in very rare instances. Each native sealer, however, was allowed to draw supplies against this fund at a fixed rate each week until the cost of such supplies equaled the amount of the native's credit from earnings; after this, supplies to be issued to him directly from the stores in sufficient quantity to support himself and family.

The various statements of the division of natives' earnings are filed in the Bureau of Fisheries at Washington.

Census of inhabitants.—On St. Paul, on June 30, 1910, there were 198 resident natives, including 98 males and 100 females, a net increase of 5 over the previous census. During the year 13 births, 1 arrival, and 9 deaths occurred.

On St. George, at the same date in 1910, 91 natives were present, of which 45 were males and 46 females. Six births and 2 deaths occurred during the year, leaving a net increase of 4 in the population.

Detailed censuses are filed in the Bureau of Fisheries at Washington.

MANAGEMENT OF SEAL HERD.

MARKING OF BACHELORS.

The general instructions to the agent, dated May 9, 1910, required that not any 2-year-old bachelors but only 500 3-year-old bachelors should be marked to form the breeding reserve. This was predicated upon the assumption that the 500 3-year-olds so reserved would be over 14 per cent of the whole number of such young males in the herd. Subsequently, by a telegram from the Secretary dated June 6, which, not having been delivered, presumably through the fault of the telegraph company, was repeated June 10, the number of

3-year-old males to be reserved by marking was increased from 500 to 1,000.

These were apportioned between the two islands, by assigning 800 to St. Paul and 200 to St. George, for the reason that there are in round numbers four times as many breeding seals on St. Paul as on St. George. Upon arrival at St. George Island a copy of the annual instructions was given to Assistant Agent Clark, and he was also informed that the quota of bachelors to be reserved on St. George was 200 3-year-olds. As the vessel remained at St. George only a few hours, and as numerous other matters required consideration, it was not possible to put into writing the various explanations of the instructions.

Upon my return to St. George Island two weeks later I was informed by Agent Clark that the quota of marked bachelors had been secured. No statement of the number so marked, however, was made, and at the close of the season among the data received detailing the season's work on St. George no mention was made of the number of bachelors branded. Upon meeting Agent Clark on the *Homer* after he had left St. George for San Francisco, upon specific inquiry I ascertained for the first time that the instructions were misapprehended by him and that he had sought to brand on St. George only 100 3-year-olds, and did actually brand only 108 of that class of young males. He had not the memoranda showing the dates on which drives were made for this purpose and the number secured from each drive. As the season then had been closed for three weeks it was useless to cause the marking of an additional number to make up the deficiency in the breeding reserve for that island.

On St. Paul, however, more young males were branded than the total number for both islands required by the instructions. Previous to my arrival on that island, on June 29, with the current instructions, Assistant Agent Judge, acting under the instructions for the previous year, had already marked 337 2-year olds in addition to 279 3-year-olds, 14 4-year-olds, and 5 5-year-olds. After my arrival additional 3-year-olds only were marked to complete the number of that class required for St. Paul. A record of the bachelors marked on St. Paul, showing also dates and rookeries driven from, follows:

Record of Bachelors Marked on St. Paul Island for Breeding Purposes, Season of 1910.

Date.	Rookery.	Two years.	Three years.	Four years.	Five years.
June 17	Reef	46	77		
27	Zapadni	82	56		
28	Reef and Gorbatch	209	146	14	5
July 2	Northeast Point		246		
4	Reef		191		
5	Zapadni		91		
	Total	337	807	14	5

The total number of bachelors marked on both islands, therefore, would be as follows: 2-year-olds, 337; 3-year-olds, 915; 4-year-olds, 14; 5-year-olds, 5; total, 1,271.

The report of London trade sales this year shows that 5,006 large pup and middling pup skins (which are accepted to be those of 3-year-old bachelors) appeared in the 1910 catch. Adding to these the 915 reserved 3-year-olds would make a total of 5,921 of that class which we might claim were in the herd in 1910. Of this whole number, the number reserved (915) is over 15 per cent.

Two-year-old males were not required by the current instructions to be reserved, for the reason that the number of 2-year-olds having skins of 5 pounds and under, together with those 2-year-olds which would not appear in the drives at all, of which there are always some, it was believed would be sufficient to supply the necessary number of 3-year-olds in 1911.

STATISTICS OF KILLING.

St. Paul.—From August 9, 1909, to June 17, 1910, 6 drives of seals on St. Paul and 2 on Sea Lion Rock were made to furnish food to the inhabitants of St. Paul. From these, 1,573 skins were obtained, including 1 from a seal found dead at Rocky Point. From July 3 to 31, 29 drives were made on St. Paul for skins, in which 8,683 skins were secured. On August 10, 1910, an additional drive was made to furnish food for the natives during the coming "stagey season," from which 496 skins were secured. From the sources enumerated a total of 10,752 skins were obtained during the season ended August 10, 1910.

St. George.—On St. George during the so-called food-killing season, from August to November, 1909, 18 seals were killed at various dates by the guard at Zapadni; 8 drives also were made, in which 482 seals were killed, filling the quota of 500 for food allowed for that island. During the season of killing for skins, 2,314 skins were secured in 10 drives, 16 were obtained from the seals killed at various times by watchmen for food, and 4 were left in salt from the previous season, a total of 2,334, in addition to the 500 taken during the food-killing season.

SKINS SHIPPED.

St. Paul.—Of the skins taken on St. Paul, 664 were delivered to the North American Commercial Company, under authority of the department's letter of January 5, 1910, to complete that company's quota of 15,000 skins for 1909. The remainder, 10,088 skins, were available for shipment on Government account. While this number

supposedly was shipped from St. Paul on the *Homer*, on August 28, word was received in October last from Assistant Agent H. D. Chichester, in charge on St. Paul, that after the departure of the *Homer* with the skins on board a bundle containing 2 sealskins was found wedged under the floor of the skin lighter or bidarra, in which crevice it had become obscured during the shipment of the skins. These two were placed in the salt house to apply on the shipment of the following year. The total number of skins, therefore, shipped from St. Paul in 1910 for Government account was 10,086.

St. George.—On August 23, 1910, the whole number of skins taken on St. George, from the sources enumerated (2,834), were placed on board the *Homer* to be shipped to San Francisco for Government account.

The whole number of skins from both islands, recapitulated from the data already given, is as follows:

From St. Paul:	
By North American Commercial Company	664
By Government	10,086
From St. George, by Government	2,834
Total	13,584

RECORD OF DRIVES.

On St. Paul, during the season of 1910, no record was kept of the seals dismissed from the food drive made on June 6 on Sea Lion Rock, as the configuration of the ground there is such that the seals can not be herded, but escape in every direction upon the landing of the clubbers, who kill such as they can while the seals are running off. So also no record was kept in the drive for "branding" on June 17, from which at the same time 145 seals were killed. The record of dismissals, therefore, begins on July 3, when the drive was made at Northeast Point for "branding," at which, at the same time, the 2-year-old bachelors in the drive, not being required to be marked, were killed.

In the 32 drives made on St. Paul from July 3 to August 10, a total of 12,434 seals appeared, of which 9,179, or 73 per cent, were killed and 3,255 dismissed. Those dismissed consisted of 1,581 small, 825 large, and 849 of those marked for the breeding reserve. This killing was 4 per cent closer than during the lessee's killing season of 1909, when 69 per cent of all seals driven were killed.

Seals Killed and Seals Dismissed from Drives on St. Paul Island, Season of 1910.

Date.	Rookery.	Killed.	Dismissed.			Total driven.	Per cent killed.
			Small.	Large.	Branded.		
July 3	Northeast Point	437	32	67	....	536	81
4	Reef	331	48	31	....	410	80
5	Zapadni	166	48	31	....	245	67
6	Tolstoi and Lukanin	142	6	39	28	215	66
7	Halfway Point	77	2	9	3	91	84
8	Northeast Point	293	37	47	85	462	63
9	Reef and Gorbatch	437	21	28	116	602	72
9	Tolstoi and Lukanin	120	2	17	5	144	83
10	Zapadni	198	10	18	32	258	76
14	Northeast Point	407	16	35	15	473	86
14	Polovina	5	....	10	....	15	33
15	Reef and Gorbatch	429	19	9	17	474	90
15	Tolstoi and Lukanin	131	17	8	2	158	82
16	Zapadni	339	77	22	24	462	73
20	Northeast Point	487	132	29	26	674	72
20	Halfway Point	5	....	....	1	6	83
21	Reef and Gorbatch	548	56	33	42	679	80
21	Tolstoi and Lukanin	449	53	23	26	551	81
22	Zapadni	346	51	32	32	461	75
25	Northeast Point	465	48	65	38	616	75
25	Halfway Point	18	....	17	3	38	47
26	Reef and Gorbatch	664	139	30	78	911	72
26	Tolstoi and Lukanin	336	32	35	37	440	76
28	Zapadni	318	55	14	44	431	73
28	Halfway Point	12	1	2	1	16	75
29	Northeast Point	589	64	68	23	744	79
30	Reef and Gorbatch	575	86	37	55	753	76
30	Tolstoi and Lukanin	204	29	29	21	283	72
31	Zapadni	155	25	16	26	222	69
Aug. 10	Reef and Gorbatch	496	475	24	69	1,064	46
	Total	9,179	1,581	825	849	12,434	73

Classification of Large Seals Dismissed from Drives on St. Paul Island, Season of 1910.

Date.	Rookery.	Four years.	Five years.	Six years.	Seven years.	Adult.
July 4	Reef	7	9	9	6	....
5	Zapadni	12	6	11	2	....
6	Tolstoi and Lukanin	11	8	11	6	3
7	Halfway Point	1	2	6	....	....
8	Northeast Point	10	9	14	14	....
9	Reef and Gorbatch	8	9	2	9	....
9	Tolstoi and Lukanin	8	2	....	7	....
10	Zapadni	8	5	3	2	....
14	Northeast Point	12	6	10	7	....
14	Polovina	2	3	....	5	....
15	Reef and Gorbatch	4	2	3	....	....
15	Tolstoi and Lukanin	4	2	....	2	....
16	Zapadni	10	4	3	3	2
20	Northeast Point	19	5	4	1	....
20	Halfway Point	....	....	....	....	....
21	Reef and Gorbatch	2	9	12	10	....
21	Tolstoi and Lukanin	4	9	4	6	....
22	Zapadni	16	10	4	2	....
25	Northeast Point	24	21	18	2	....
25	Halfway Point	3	4	4	4	2
26	Reef and Gorbatch	10	5	12	3	....
26	Tolstoi and Lukanin	13	16	5	1	....
28	Zapadni	8	2	....	2	2
28	Halfway Point	....	1	....	1	....
29	Northeast Point	17	9	3	5	4
30	Reef and Gorbatch	14	16	4	1	2
30	Tolstoi and Lukanin	7	16	2	4	....
31	Zapadni	9	4	2	....	1
Aug. 10	Reef and Gorbatch	12	1	2	6	3
	Total	255	195	148	111	19

On St. George the record of seals driven and dismissed covers the period from June 13 to July 31. In this time 3,065 seals were driven and 2,295 killed, while 240 small, 343 large, and 187 marked seals were released. The number killed represents 74 per cent of the whole number driven, an increase of 11 per cent over the killings of 1909, when 63 per cent of those driven were killed.

SEALS KILLED AND SEALS DISMISSED FROM DRIVES ON ST. GEORGE ISLAND, SEASON OF 1910.

Date.	Rookery.	Killed.	Dismissed.			Tota driven.	Per cent killed.
			Small.	Large.	Branded.		
June 13	East	31	4	38		73	42
23	East and North	138	11	93		242	57
30	....do	162	16	79		255	63
July 5	East, North, and Staraya Artel	171	55	30	58	314	54
12	....do	313	26	14	21	374	83
16	North	258	18	5	5	286	90
21	North and East	376	48	15	27	466	80
26	East, North, and Staraya Artel	405	42	35	37	519	77
31	....do	441	20	36	39	536	82
	Total	2,295	240	343	187	3,065	74

CLASSIFICATION OF LARGE SEALS DISMISSED FROM DRIVES ON ST. GEORGE ISLAND, SEASON OF 1910.

Date.	Rookery.	Four years.	Five years.	Six years.	Seven years.
June 13	East	17	9	9	3
23	East and North	25	43	18	7
30	....do	39	7	21	10
July 5	East, North, and Staraya Artel	8	13	6	3
12	....do	4	4	6	
16	North	4		1	
21	North and East	8	5		2
26	East, North, and Staraya Artel	13	6	11	5
31	....do	13	11	6	6
	Total	131	98	78	36

It will doubtless be remarked that the percentage of seals killed in 1910 was greater than in the preceding year. The seals killed in 1910 were, however, neither larger nor smaller than those taken in 1909, but conformed at least as closely to the prescribed ages and weights as they did in 1909, the last year of the leasing system. Indeed, when doubt arose, as often it does arise, whether a seal was of the 3-year-old (or killable) age or whether it was of the 4-year-old (or prohibited) age, in 1910 the animal was allowed to escape, whereas in 1909 it would have been killed. In this respect it may be said that the killing in 1910 conformed even more closely to regulations than that of 1909.

Since the animals killed in 1910 were of the same class as those of the preceding year, and since the rejections from the drives were

fewer in proportion to those killed, it must be concluded that this condition is due not to closer killing, but to the absence, for some reason, of those animals which are not killable and which when they appear in drives make up the number of "rejected" seals. In other words, the bachelors driven were not culled more closely for killables, but fewer rejectable seals appeared in the drives, thereby making the rejection percentages smaller.

One certain reason for this increased percentage of killed in 1910 is to be found in the lessened number of "branded" or marked bachelors with which to deal during the killing. In previous years 2,000 of these marked bachelors were present during the killing season, while in 1910 only 1,000 of them were marked. Furthermore this missing thousand would have been composed of 2-year-olds which haul up on the bachelors' hauling-grounds much more frequently than do the 3-year-olds. With 1,000 2-year-olds marked for exemption from killing, it would have been certain that from 1,200 to 1,500 more rejections would have occurred during the season, the number of rejections of this class varying somewhat from year to year. On the other hand, rarely does the number of subsequent rejections of the 3-year-olds equal the number of that class actually marked.

Had 1,200 been added to the number of rejections obtained in 1910, the percentage of killed would have been 69, very nearly what it was in the year preceding.

Another presumed cause of the lack of small rejections last year is the probable fact that the smaller seals, i. e., those that had skins under 5 pounds in weight, failed to haul up on land proportionately in the same numbers as hitherto; that is to say, these small seals remained for longer periods in the water than usual. In respect to this matter we are met with the fact that we are wholly unable to state anything definite concerning the hauling habits of young bachelors. Some are always in the water and on inaccessible hauling grounds, for which reasons no definite idea of the whole number in existence can be obtained. Nevertheless, it is known that the hauling habits of seals vary from year to year; that these habits are altered by circumstances not incident to their natural environment, such as the action and movement of the pelagic fleet; that these bachelors haul in one year in greater numbers proportionately on one island than the other, or on one rookery than on other rookeries; that they return to their normal habits with the disappearance of the cause which forced them to abandon those habits temporarily.

For 1910 it can be shown that these small seals, which were yearlings the preceding year, were not killed, either as pups or yearlings. Yearlings are never killed on land except through unavoidable accident, and an analysis of London sales of skins shows that yearlings form but a small fraction of 1 per cent of the pelagic catch. Unless they

died from natural causes, of which there is no evidence, they must be in existence somewhere as 2-year-olds. Not having appeared on land during the summer, the natural inference must be that they were in the water and did not haul on land.

That there were in existence small seals which did not haul during the summer might be indicated by the fact that in the killing on August 10 the number of small seals turned away was entirely out of proportion to the usual number occurring in drives during the season. The absence of these small seals during the summer was a matter of remark, and their reappearance at the last drive of the season also was noted with interest.

In treating of this matter it is desired to show that notwithstanding the fact that of seals driven a greater percentage killed appears on the record for this year as compared with last, no smaller seals than usual were killed and not as large seals were taken as previously. The increased percentage is the result, first, of the absence of 2-year-old marked bachelors present in former years, and secondly, to a failure of young nonkillable seals to haul on land in their usual numbers during the summer.

WEIGHTS OF SKINS TAKEN.

Of the 10,752 skins taken on St. Paul, 10,749 were weighed. Of these 70 were under 5 pounds and 48 over 8½ pounds. On St. George, 2,834 skins were weighed, of which 20 were under 5 pounds and 11 over 8½. Of the overweight skins on St. Paul, nearly all were taken in a food killing on Sea Lion Rock, and before weighing were immersed in sea water until they were saturated. In this condition each carried several pounds of water, increasing their weight correspondingly. Had they been weighed dry, or even with the usual quantity of moisture, few of them would have been above the prescribed limit.

It is not possible to avoid wetting the seals taken on Sea Lion Rock, neither is it permissible to salt the skins without weighing. It is wholly undesirable also to alter the statistics of weights in such manner as to attempt to compensate for excess due to the presence of water or other foreign substances in the fur. The weights therefore have been recorded as taken, but due allowance must be made for conditions which change the weights and which have no relation to the size of the skins.

The skins that were underweight were likewise taken mainly in food drives, at a time when the natives were eager for fresh meat and when they were restricted to killing seals having skins under 7 pounds. With the necessity of rejecting all the females and all the larger males from the food drives, it can readily be appreciated that the tendency of the natives is to let few of the small males escape, even if the skins weigh a few ounces less than 5 pounds.

On the whole it can be seen that only a few skins of the whole catch were outside the weights prescribed and that these were taken unavoidably.

WEIGHTS OF SEALSKINS TAKEN ON THE PRIBILOF ISLANDS, ALASKA, DURING THE YEAR ENDED AUGUST 10, 1910.

Weight.	St. Paul Island.[a]	Weight.	St. George Island.[b]
Pounds.		*Pounds.*	
4	6	4	1
$4\frac{1}{4}$	4	$4\frac{1}{2}$	5
$4\frac{1}{2}$	20	$4\frac{3}{4}$	14
$4\frac{3}{4}$	40	5	125
5	670	$5\frac{1}{4}$	82
$5\frac{1}{4}$	710	$5\frac{1}{2}$	406
$5\frac{1}{2}$	1,014	$5\frac{3}{4}$	202
$5\frac{3}{4}$	1,277	6	628
6	980	$6\frac{1}{4}$	106
$6\frac{1}{4}$	1,113	$6\frac{1}{2}$	524
$6\frac{1}{2}$	1,176	$6\frac{3}{4}$	114
$6\frac{3}{4}$	993	7	321
7	752	$7\frac{1}{4}$	43
$7\frac{1}{4}$	553	$7\frac{1}{2}$	168
$7\frac{1}{2}$	552	$7\frac{3}{4}$	21
$7\frac{3}{4}$	327	8	54
8	203	$8\frac{1}{4}$	4
$8\frac{1}{4}$	172	$8\frac{1}{2}$	5
$8\frac{1}{2}$	139	9	6
$8\frac{3}{4}$	7	$9\frac{1}{4}$	1
9	17	$9\frac{1}{2}$	2
$9\frac{1}{4}$	4	$10\frac{1}{4}$	1
$9\frac{1}{2}$	7	$10\frac{1}{2}$	1
$9\frac{3}{4}$	4		
$10\frac{1}{4}$	1	Total	2,834
$10\frac{1}{2}$	2		
11	1		
$11\frac{1}{4}$	4		
12	1		
Total	10,749		

[a] Nearly all the oversize skins listed from St. Paul Island were taken in a food killing from Sea Lion Rock, on which occasion the skins when weighed carried from 1 to 3 pounds of water each. Had they been dry when weighed, very few or none would have exceeded the prescribed weights. The major portion of skins underweight were taken in food drives for the natives, when large seals were released, and, consequently, the smaller seals were killed closely.

[b] Of the skins from St. George over or under the limit of weight only 3 were taken during the sealing season proper. Four were taken by the company last year, and withheld from the quota; the others were taken during food killings, when the natives were particularly eager for fresh meat.

Following is a statement furnished by Messrs. C. M. Lampson & Co., of the sizes of the sealskins consigned to them by the United States Government for auction in London. This statement shows the classification of the 12,920 skins as weighed and assorted upon their receipt by the firm.

Assortment of Alaska Salted Fur Sealskins for Account of United States Government, Department of Commerce and Labor.

[London, 19th November, 1910, 64 Queen Street, E. C. Subject to recount.]

		Lbs.	oz.
78	smalls	7	15
713	large pups	7	2
3,032	middling pups	6	7
4,899	small pups	5	12
1,266	ex. small pups	5	5
11	ex. ex. small pups	4	10
33	smails, low	7	11
135	large pups, low	6	9
498	middling pups, low	6	1
501	small pups, low	5	9
88	ex small pups, low	5	0
10	smalls, cut	7	2
71	large pups, cut	6	13
238	middling pups, cut	6	2
421	small pups, cut	5	6
81	ex. small pups, cut	4	15
6	smalls, rubbed	7	0
55	large pups, rubbed	6	14
195	middling pups, rubbed	6	6
290	small pups, rubbed	5	11
75	ex. small pups, rubbed	5	3
36	faulty.		
12,732			
5	smalls.		
21	large pups.		
48	middling pups.		
94	small pups.		
18	ex. small pups.		
2	faulty.		
188			
[a] 12,922			

[a] See p. 15. This number recorded as shipped, but two skins afterwards found wedged under floor of boat used for lightering skins to steamer *Homer*.

ENUMERATION OF BREEDING HERD.

COUNTS OF HAREMS.

The usual counting of harems and idle bulls at the height of the season of 1910 disclosed the following:

Count of Harems and Idle Bulls on St. Paul Island, 1910.

Date.	Rookery.	Harems.	Idle bulls.	Quitters.	Water bulls.
July 12	Lagoon	9	3		
12	Tolstoi Cliffs	29	5	1	
12	Tolstoi	77	7	1	5
12	Zapadni Reef	7		3	
12	Little Zapadni	54	10	4	4
13	Kitovi	53	7	4	4
13	Amphitheater	9	2	1	
13	Lukanin	41	5	6	5
13	Ardiguen	11	1		
13	Gorbatch Cliffs	2		2	
13–15	Gorbatch	110	12	15	
13–15	Polavina	50	5	2	10
13–15	Polavina Cliffs	20	5	5	
13–15	Little Polavina	12	2	7	
14	North East Point	251	30	17	10
15	Reef	206	28	4	13
16	Zapadni	118	22	9	4
	Total	1,059	144	81	55

The number of harems on Sea Lion Rock, which could not be visited at this season, is placed at 61, the number found last year.

COUNT OF HAREMS AND IDLE BULLS ON ST. GEORGE ISLAND, 1910.

Date.	Rookery.	Harems.	Idle bulls.	Hauling-ground bulls.	Quitters.
July 14	Little East	4			
	East Reef	22	6		
	East Cliffs	37	a 14		
	North	103	21	10	
	Staraya Artel	48	17	21	
	Zapadni	47	19	16	1
	Total	261	77	47	1

a Includes hauling-ground bulls.

A summary of the number of bulls on both islands, with a comparison of the number found in 1909, follows:

SUMMARY OF BULLS ON ST. PAUL AND ST. GEORGE ISLANDS, 1910.

	Harems.	Idle bulls.	Quitters.	Hauling-ground bulls.	Water bulls.
St. Paul	1,059	144	81		55
St. George	261	77	1	47	
Sea Lion Rock	a 61				
Total, 1910	1,381	221	82	47	55
Total, 1909	1,399	172	139	98	13

a Estimated.

Compared with 1909 the number of harems on both islands has decreased 18, or 1.3 per cent, an inappreciable decrease when contrasted with that which has occurred annually for years. This decrease in harems can not be laid to a scarcity of bulls, as can easily be proved, but to a lack of enough cows to provide other bulls with harems.

On the other hand the number of idle bulls—that is to say, those mature adult males stationed on rookeries waiting for cows—has been increased from 172 to 221, or a gain of 29 per cent. This is the result of the saving of young males by marking and of further restrictions upon killing, commenced in 1904.

The number of 7-year old males or "quitters," so termed because of their tendency while idle to desert their stations when approached by man, has decreased from 139 to 82; the number of water bulls has increased from 13 to 55, and of the hauling-ground bulls there has been a decrease from 98 to 47. As these latter classes are more or less unstable and as some of each class could have been in the water at the time these counts were made, it is not attempted to ascribe specific reasons for the fluctuations in them. The fact is demonstrated, however, that young bulls are present in fair numbers. The further fact that 13 per cent of the stationed bulls, excluding quitters,

are idle, indicates conclusively that the herd of breeding bulls is properly safeguarded from too close killing by existing regulations.

COUNTS OF PUPS.

Because of the presence of Japanese schooners in numbers close to the islands, counts of pups on St. Paul Island were limited to Kitovi rookery, including Amphitheater. On St. George Island, for the same reason, pups were not counted except on Little East rookery, which now embraces only a few seals. The St. Paul counts follow:

Counts of Pups on St. Paul Island, 1910.

	Live pups.	Dead pups.	Total pups.	Harems.	Average harem.
Kitovi	1,717	57	1,774	53	33.4
Amphitheater	187	5	192	9	21.3
Total, 1910	1,904	62	1,966	62	31.7
Total, 1909	1,915	64	1,979	58	34.1

From the comparisons which the foregoing data afford, it would appear that the breeding cows on this rookery have not decreased but have remained virtually stationery as regards numbers during this period. The harems thereon, however, are more numerous, thus giving fewer cows to each bull, or, technically speaking, lowering the average harem on this space from 34.1 in 1909 to 31.7 in 1910.

On St. George the count of pups on Little East, which, as stated, was the only count of pups made on that island, disclosed 75 pups in 4 harems, or an average of 18.7 cows per harem. The great decrease in this rookery (Little East) may be appreciated when it is noted that in 1897 the seal census made by the Jordan Commission gave to this rookery 46 harems and 1,190 cows. The number found there in 1910 represents a diminution in thirteen years on this small rookery alone of 42 harems and 1,115 cows.

NUMBER OF BREEDING COWS.

As it is highly impracticable to count the pups on all the rookeries, it has been customary to arrive at the whole number of breeding cows by estimation based upon an actual count of the whole number of harems on the islands and the average number of cows found to be in each of the harems of one rookery which is accepted as typical of all.

As the number of harems on all islands has been ascertained to be 1,381 and the average harem, as demonstrated by the count of Kitovi, to be 31.7, the whole number of breeding cows in 1910 would be 43,777. As 45,786 of such cows were shown by this method to

be present in 1909, the decrease between the years, 2,009, represents a loss of 4.3 per cent.

This for all practical purposes, is a fairly accurate measure of the number of breeding cows, which constitute the most important factor in the herd. While merely an estimate, the number is close enough to actual conditions to be approximately correct. A loss of only 4.3 per cent in the breeding cows from the pelagic sealing which has been practiced with such assiduity during 1910 would seem too small. However, the statistics of the seal herd for the last few years demonstrate that the rate of decrease during this period has not been large, and it is not out of the way to believe that it was small in 1910.

CENSUS OF ENTIRE SEAL HERD.

Beyond the breeding cows and pups, estimates of which contain much of accuracy, an estimate of the whole herd is very difficult to make, and is unsatisfactory in that it treats of elements which are not susceptible of ascertainment and must be approximated. There are also very few means of testing its accuracy at this or a future time. The methods used are, however, the best that can be devised and tend in the direction of accuracy rather than the opposite.

ESTIMATE OF HALF BULLS.

The record of rejections of seals from drives during the summer season of 1910 shows that 1,168 young males too large to be killed were released from the killing fields. It has been established that not by any means all of this class of animals haul in places where they can be enumerated and that the number of those actually turned away should be doubled at least to arrive at the whole number in existence.

By doubling the number found, 1,168, we would have 2,336 half bulls, from which we may look for recruits to the breeding bulls.

ESTIMATE OF 2-YEAR-OLDS.

In 1908 it was computed that 53,884 pups were born. Being equally divided as to sex, one half, or 26,942, were males and an equal number females.

In 1909, if we allow the diminution of 50 per cent for mortality at sea, which has been taken heretofore to occur among the pups during their first migration, one-half of these would return in 1909 as yearlings. There should have been then in 1909 by this method of computation 13,471 yearling males and an equal number of females. These, with a loss of something like 10 per cent, would return in 1910 as 2-year-olds to the number of approximately 12,124 of each sex.

We should have in 1910, therefore, by this computation, over 12,000 virgin or 2-year-old cows and an equal number of males.

From the latter, however, at least 7,500 were killed during the last summer, leaving approximately 4,500 2-year-old males in existence at the close of the season. The above computation would indicate that 12,124 2-year-old cows and 4,500 2-year-old males were present at the end of the killing season of 1910.

NUMBER OF YEARLINGS.

In 1909 it was estimated that 45,764 pups were born, half of which were males and half females. By applying a 50 per cent death rate during their initial migration we should have in 1910 11,441 yearling males and the same number of yearling females.

NUMBER OF 3-YEAR-OLDS.

Nine hundred and fifteen 3-year-olds were marked during the summer and released as breeders. An uncertain number in addition was not driven at all and still survive. It would be a moderate allowance to estimate the number of 3-year-olds remaining in the herd at 1,200.

SUMMARY OF SEAL LIFE IN 1910.

From the foregoing computations an approximate census of seal life present on the islands at the close of the sealing season of 1910 would be as follows:

Bulls, active with harems	1,381
Bulls, idle, and quitters	303
Half bulls	2,336
3-year-old bachelors	1,200
2-year-old bachelors	4,500
Yearling bachelors	11,441
Male pups	21,888
Breeding cows	43,777
2-year-old (virgin) cows	12,124
Yearling females	11,441
Female pups	21,888
Total	132,279

The foregoing "census," if we except the bulls with harems, and those idle, is nothing more than an estimate based upon such enumerations as could be made that were of value in determining the number of seals. While it shows over 2,000 seals less than a similar computation in 1909, it nevertheless exhibits apparent increases in certain classes of seals over the preceding census spoken of. For example, the 2-year-old bachelors estimated to be present in 1910 exceed in numbers by over 2,000 those stated to be in existence at the close of the season of 1909. The 2-year-old cows estimated in 1910 are 2,000 more than were assigned for the previous year.

This is the result solely of the method of estimation adopted alike for both years. Both are based upon the number of cows born two years previously. In 1907, 50,825 pups were estimated to have been born, and 10,165 of these were computed to have survived as 2-year-old males in 1909. On the other hand, in 1908, the same method of estimation would indicate that 53,884 pups were born in that year—3,000 more than in 1907—and that of these the number surviving as 2-year-olds in 1910 was 12,124.

It is believed that it is not the intention of anyone to claim that an increase in seal life has occurred at any time within the past few years in the face of the large catches of seals in the water, consisting mainly of breeding females. It is believed, on the other hand, that a marked decrease has occurred, a belief justified when the contracted space occupied by the breeding seals is viewed. But the measure of this decrease is ascertainable solely by estimation, the same methods being used from year to year. When using only a few seals in establishing a basis for computing the whole number, it is not difficult to realize that a few chance harems more or less on the space counted would have the effect of greatly increasing or decreasing the whole number computed to be in the herd. It would be easy to revise these calculations by adding to or subtracting from the estimated number to make it conform with one's idea of what number should or should not be found. But the idea one may have might be more incorrect than the result of the computation, so that in a revision it would not be possible to determine whether in increasing or decreasing the result one were moving in the direction of accuracy or away from it. It is much better to announce the number each year as it may appear from calculations made similarly, and to explain any apparent incongruity by the statement that the whole is an estimate and nothing else.

The result of the killing of 1910 has demonstrated that the number of 2-year-old bachelors estimated as remaining in the herd at the close of the season of 1909 was entirely too small. In the census of 1909 only 2,165 2-year-old bachelors were allowed. These of course would be 3-year-olds in 1910. As a matter of fact, the skins of 1910 when classified in London showed that perhaps 5,000 of the catch were 3-year-olds. In view of this fact it is believed that, in estimating the number of these as well as other immature seals, a smaller death rate should be allowed than hitherto.

PUP-RAISING EXPERIMENTS.

In accordance with the Bureau's instructions, attempts were made on both St. Paul and St. George Islands to feed starving pups and save their lives. On St. Paul Island the efforts were unsuccessful, but the St. George experiments yielded most interesting results.

ST. PAUL EXPERIMENTS.

Perhaps a dozen or more starving pups were gathered off the various rookeries and brought to the village. An inclosure was built at the end of the village pond and the pups were placed in this.

A bottle with an ordinary rubber nipple was used in a first attempt to induce the little animals to nurse. This method failing, however, milk was poured down the pups' throats from the bottle. But this, besides being difficult and tedious, was uncertain and wasteful, as most of the milk was ejected by the pups before being swallowed. To feed a dozen or more pups with a bottle, moreover, occupied the services of half a dozen men for nearly half a day. Afterwards a tube attached to a funnel was passed into the stomach of each pup and the feeding was accomplished by this means.

Owing to lack of proper material the inclosure in which the pups were placed could not be made tight enough to retain them. Some of the pups escaped to the sea; the others died. Feeding with solid food was not attempted.

Upon the departure of the *Bear* on her last trip from the islands, 10 healthy pups upon which no feeding experiments had been attempted were taken from St. Paul rookeries and placed aboard that vessel to be shipped to Seattle for the use of the Bureau. All of these arrived safely, having been schooled on the voyage to eat solid food.

ST. GEORGE EXPERIMENTS.

Fifteen starving pups were gathered on St. George Island at various times and different methods were tried to save their lives.

These starvelings readily ate all the small live fish that could be obtained and such other larger fish as the weather would permit the natives to capture offshore. In addition the pups ate salted salmon after it had been freshened in water. Had enough live or fresh dead fish been obtainable it is believed that at least some of the pups that were fed artificially could have been saved.

On September 10, 1910, four starving pups were secured and their frenums cut. All were fed by injections of milk into the stomach. One died that night from congestion of the lungs, probably because of the introduction into the pulmonary tract of milk while feeding. Upon autopsy of this animal, a piece of coal as large as a walnut was found lodged in the pylorus. Two of the others escaped the first night.

A corral, having a tank 4 feet by 8 feet and 1 foot deep, was then built and two more pups in addition to the one now remaining were placed in it on September 15. Into this tank filled with water were placed a number of small fish caught among the rocks (probably *Neoliparis*). The pups ate all of these at once and some sculpin cut

into small pieces. After this several attempts were made to provide sufficient fresh fish to feed the pups, but owing to rough weather only several days' supply could be obtained. After this salt salmon freshened in water was offered to the pups and eaten. When this latter was finally refused, milk and mutton broth were fed to sickly pups.

All but one of these pups, 15 in all, died on the island, and that one, after being placed aboard the *Bear*, died before reaching Seattle.

These experiments are of value, however, as demonstrating that by September 15 these pups have advanced to such a stage that they can eat and digest solid food even though they continue to nurse during October and November. The results also show, however, that on the seal islands these experiments can not be carried on with hope of success because fresh fish can not be obtained with regularity in sufficient quantity. Had these pups been taken to Unalaska, where small fish can be readily obtained, it is believed that much better results would have followed.

Of the 14 that died on St. George Island, the autopsies in 2 cases disclosed occlusion of the pylorus by stones taken through the mouth. The death of at least 1 of the pups was due to this condition.

PELAGIC SEALING.

During the season of 1910, 25 Japanese sealing schooners were boarded by revenue-cutter vessels on patrol in Bering Sea. Of these, 2 were seized by the cutters, 1 for a violation of the alien fishing laws and another for a violation of the customs law (section 2773, Revised Statutes). As a rule pelagic sealing vessels kept outside the 3-mile limit, and, so far as known, none of the men composing the crews landed upon the islands for the purpose of killing seals.

Eleven Japanese in 3 small boats landed on St. Paul Island on July 30 and 31. It was stated by them that they had been lost from their schooners and came to the islands as a place of refuge. They were quartered on the islands until August 8, when they were placed aboard the *Manning* and taken to Unalaska with 4 native witnesses, charged with having landed upon the islands without permission, in violation of the act of April 21, 1910.

Upon trial before the United States commissioner at Unalaska they were found guilty and each sentenced to a week's imprisonment. After serving this sentence they were placed aboard a Japanese sealing schooner with their boats, guns, and other property and sent home.

Unofficial reports indicate that 5 Canadian sealing vessels took seals last year in Bering Sea. Their catch from both the Pribilof

and Asiatic herds aggregated 3,775 skins. The total pelagic catch from the Pribilof herd, as shown by London trade sales, was in the neighborhood of 15,000 skins.

WRECK OF REVENUE CUTTER PERRY.

On the early morning of July 26, 1910, the revenue cutter *Perry* went ashore on Rocky Point Reef, St. Paul Island, in a thick fog. Shortly afterwards, by the action of the swell, her bottom was punctured on the rocks upon which she lay, and all efforts to get her off were futile. Such movable property (guns, stores, boats, etc.) as could be readily transported was brought ashore and stored in an empty warehouse at Rocky Point. The entire crew was quartered at the village for several days and was made as comfortable as circumstances permitted. The teams and native men on the islands were used for several days in rendering assistance. Later the *Perry's* men and stores were taken aboard the other cutters in the fleet and the wreck stripped and abandoned. On August 19 the hull was broken up by a strong southerly gale and scarcely anything was left to mark where she grounded.

FOXES.

The history of foxing on the Pribilof Islands is interesting. What number of fox skins were taken off these islands by the Russians will never be known. Petroff (1883) states that 34,767 were taken from 1842 to 1860, inclusive. From that date to 1867, the fox skins taken from the islands are not segregated from the returns of those taken from general Alaskan sources, which are given by Petroff as 27,731. From 1870 to 1890 fox skins to the number of 4,380 on St. Paul and 20,412 on St. George were taken and shipped by the Alaska Commercial Company. From 1890 to 1910, 2,963 fox skins were taken on St. Paul and 13,641 on St. George.

During the lease of the Alaska Commercial Company (1870–1889), there existed no contract with the Government for the right to purchase these skins, and the only expenditure by the company for the more than 24,000 skins it received was the 50 cents it paid the natives for each skin. The North American Commercial Company during the greater portion of its 20-year lease paid to the natives \$5 for each blue and \$1 for each white fox skin.

Foxes are trapped annually on St. George Island in house traps which do not injure the animal. The catch last year there was 227. On St. Paul Island, where these animals never have been as plentiful as they were on the other island, no trapping has been done since 1903 until last winter (1909–10), when 185 were secured. These were killed in steel traps. For the blues the natives received \$5 apiece; for the whites, \$1. This money was applied to the natives' support.

CONDITIONS AND TRAPPINGS ON ST. GEORGE ISLAND.

On St. George Island, during the winter of 1909–10, the feeding of foxes in the herd during the period from October 20 to June 1 was continued as in former years. Seal carcasses preserved from killings during the summer formed the greater portion of the material fed, together with about 3,000 pounds of salted codfish freshened in sea water.

For some reason, not ascertained exactly, a smaller number of foxes passed through the house and box traps during the winter in question than ever before since feeding the foxes and selective trapping began. Whether this is the result of an actual diminution in the herd, or whether other conditions, such as an abundance of food outside the traps or an instinctive fear of entering the traps, were the cause, can not be stated definitely.

During the winter of 1909–10 only 335 foxes passed through the traps on St. George Island. To show the smallness of this number as compared with former years, a table with the total number of foxes handled in the various years during which selective trapping has been followed is given below:

1898–99	842	1904–5	766
1899–1900	973	1905–6	1,061
1900–1901	1,335	1906–7	882
1901–2	1,104	1907–8	1,006
1902–3	1,011	1908–9	798
1903–4	1,061	1909–10	335

In trapping, the practice is to catch all animals alive, to release as breeders a certain number of pairs of the most vigorous, and to kill those that are not considered the best examples of the species. Those released are marked, so as to be thereafter recognizable, by clipping a ring out of the hair on the tail of the animal, the marks differing for the sexes. Such foxes as escape being trapped, not being marked of course, can be distinguished at sight.

No such number of foxes not marked was seen in the winter mentioned as to lead unquestionably to the conclusion that the herd has not diminished. There are, on the other hand, good grounds for believing that it has diminished. The causes of this probable fact, however, are obscure and conjectural. The very few found dead did not justify the belief that any epidemic had occurred.

A summary of the statistics of trapping on St. George Island during the winter of 1909–10 is appended:

Marked and released:	
Blue males	51
Blue females	57

Killed for pelts:	
Blue males	126
Blue females	86
White males	5
White females	4
Skins from animals found dead, etc	6
Skins accepted by lessee, blue	203
Skins rejected by lessee, blue	6
Skins mangey, etc., thrown away	9
White fox skins accepted by lessee	9
Total number of animals handled	335

These pelts, having been taken during the period covered by the contract of the North American Commercial Company, were delivered to it upon payment at the stipulated rate of $5 for each blue skin and $1 for each white skin. The money thus derived was used exclusively for the support of natives.

TRAPPING ON ST. PAUL ISLAND.

During the winter of 1909–10, for the first time since 1904, there were considered to be foxes enough on St. Paul to justify trapping, which accordingly was carried on during a period of six days.

On this island, unlike St. George, notwithstanding repeated efforts to secure it, the foxes do not congregate in large groups, permitting systematic feeding and selective trapping. Any trapping therefore on St. Paul must be done with the spring steel trap, in the use of which the native trappers must scatter over the entire island.

In the 6 days of trapping mentioned the St. Paul natives secured on that island 130 blue and 35 white foxes. In addition, a boat load of native men went over to Otter Island, and there secured 19 blues and 1 white. Observations made during the past summer indicate that the fox herd on St. Paul Island has not diminished appreciably as the result of this trapping of the previous winter.

The skins taken on St. Paul and Otter Islands were delivered to the North American Commercial Company and payment made at the same rate as on St. George. This difference between the management of the two islands exists, however, that whereas the earnings on St. George from fox skins are formed into a community fund, on St. Paul each individual trapper is given the use of the money from such fox skins as he has been able to secure.

RECOMMENDATIONS.

KILLING OF BACHELOR SEALS.

The methods used in taking seals during the past season of 1910 were the same as those used by the two lessees in the preceding 40 years' tenure of the sealing right, and the same, in fact, in all

fundamental respects as those pursued by the Russians since 1840. They are the result of years of experience and are the best that can be devised to meet the conditions. No change in them should be made.

The practice of killing bachelor seals for skins as well as for natives' food should not be abandoned unless a cogent reason presents itself. No harm to the seal herd can result from the killing of surplus males. No benefit to the herd could accrue from the maturing of males unnecessary for purposes of reproduction, which, when of adult age, would have no female consorts, but which, by incessant and furious fighting, would destroy or cripple the breeding bulls and themselves as well.

It is true that a test to insure the survival of the fittest should be applied to the male fur seal, as in fact it should to all breeders. It is not true, however, that this test can only be made through trial of combat. With respect to some groups of animals, such as the Pinnipedia, conditions of their natural environment may be so severe as to eliminate weaklings as effectually or even more so, than would fighting amongst themselves, and nature provides an eliminative process in the case of the fur seal entirely apart from the struggling of bulls with each other for supremacy on land. This test begins almost with a seal's birth.

When the baby seal has scarcely learned to swim beyond the borders of the rookery on which it is born, while it is still a suckling and knows not how to seek other food, it is separated from its mother and driven off the land by the rigor of the climate. Weak and unskillful swimmer as the pup is, not only must it withstand the severe winter storms in the northern ocean but in the same unfavorable element pursue and capture its food and elude its natural enemies of the sea. As the result of this struggle with the natural conditions in which it is placed it is estimated that one-half of the pups die during the initial migration. Only the strongest and most wary can survive this trial.

This struggle for existence continues incessantly during the animal's life. From each migration it sends back to the breeding grounds only those animals hardy enough to withstand its severity. That animal leaving the rookeries with any physical imperfection does not return. It dies at sea. Those that do return are the most perfect examples of their class.

With this severe eliminative test occurring as the result of natural environment, to superimpose a violent struggle with his own kind after the animal has reached the breeding ground would be to subject him to further stress entirely unnecessary to prove his ability as a breeder. Having passed successfully through the winter's migration, the animal returns to the rookeries a perfect specimen of its kind. A severe trial by combat could not have the effect of increasing

its breeding efficiency, but on the other hand could only seriously impair if not wholly destroy it. It would be the same if two valuable stallions, each physically perfect, and matched in strength and courage, were allowed to fight with each other until one were killed. The survivor, if one did survive, would be so seriously injured by its opponent as to be rendered incapable of service for the time being, if not permanently.

To breed a large number of surplus male seals merely that they may fight amongst themselves and determine the strongest in combat is useless. By the time the strongest individuals have proved their superiority they have expended so much of their energy in fighting that physically weaker but fresh animals may overpower them and take their cows. Such is the history of the Pribilof rookeries during the time when thousands of idle bulls were present. Instances to substantiate this conclusion have been witnessed many times.

Since physical combat is not required to test the ability of a male fur seal, no reason is known for providing a number of males beyond that necessary to fertilize the females in the herd. Therefore the practice of killing surplus males at the time when their pelts have a considerable commercial value should be continued. Surely no purely sentimental reason should prevail over those of practical weight.

SUPPORT OF NATIVES.

The present system of supporting the natives on the Pribilof Islands should be changed. Under it the native receives enough food, fuel, and clothing to sustain life, but only a portion of the sum necessary for his maintenance comes to him as compensation for labor performed, the remainder being donated as a gratuity through an appropriation of Congress. This latter feature is the most objectionable of all and the one which it is sought to eliminate. Better to explain the situation the following brief summary is given of the manner in which the natives have been supported since they were first transported to these islands.

In 1787, the year following the discovery of St. George Island, the discoverer, Pribilof, brought to the islands a number of native families, principally from Unalaska, and landed them there to serve as laborers in taking skins from the animals with which the islands abounded. Several other adventurers also brought natives to these islands and founded small villages at several points thereon. In 1799, upon the taking over by the Russian-American Company of the administration of the whole of Alaska, the competing traders were sent away from the Pribilofs and the islands passed under the autocratic control of Baranof. A cessation of killing was ordered, and in 1806–7 nearly all the natives were removed to Unalaska.

In 1808 seal killing began again, with accessions of laborers mainly from Unalaska and adjacent villages. On St. Paul Island the natives were drawn together and huddled into one settlement at Halfway Point. About 1825, for convenience in handling cargo, the village was again changed to its present site.

On St. George Island several settlements existed originally, but were consolidated at the present site about 1830–1835.

Under the Russian régime, especially under the management of the Russian American Company, which provided the machinery of government for the territory during the tenure of its privilege, the natives were mere slaves. They had no redress for any injury or insolence which their masters might see fit to inflict upon them. Their habitations were large communal dwellings of earth, half underground, cold, and filthy. Here they lived and died unnoticed and uncared for. They subsisted on fish and the flesh of seals, with the addition of roots and a very little flour.

In 1835, Veniaminof states, the natives worked at whatever was found and whatever they were directed to do. Payment was not established by the day or year, but for each skin taken by them or for what was placed to their credit. They received no specific wage, though they were not all of equal ability, there being usually three or four classes. In these classes the sick and old workmen were counted, although they were only burdens, and therefore received the smallest shares, about 150 rubles, and the other and better classes 220 to 250 rubles a year. Those who were zealous were rewarded by a present of 50 to 100 rubles. The wives of the Aleuts, who worked only at seal killing, received from 25 to 35 rubles. These rubles were scrip currency, made of leather, equal in value to a franc, or about 20 cents.

In 1868, at the time of the purchase of Alaska by the United States, the natives were living in semisubterranean houses built of turf and such pieces of driftwood and whalebone as they were able to secure on the beach. Their food was seal meat and a few articles furnished in meager quantity by the Russian company. They had no fuel except driftwood and blubber, and depended for heat upon crowding together in the sod houses, sleeping upon the dried grasses secured upon the islands.

In 1870 the Alaska Commercial Company took charge of the islands under a lease. It at once built neat frame dwellings for the natives, and paid them 40 cents apiece for each sealskin taken. As 100,000 were taken annually this gave the natives about $40,000 each year, enough to support them in qualified comfort. While this sum was divided on a communal basis, some natives by thrift and economy were able to save sums amounting to perhaps $2,500 each. No interference with the expenditure of their earnings was made by the agents of the government.

When, however, after 1890, under the lease of the North American Commercial Company, the take of skins was reduced to a few thousands annually, the natives faced starvation. Their earnings at this time, at the rate of 50 cents for each skin, were entirely insufficient. To relieve this situation, the Government did not increase the wages of the natives for taking skins, but, as the reduction of the catch was due mainly to arbitrary restrictions by the Government, furnished an annual appropriation of $19,500 to supplement the natives' earnings for their support.

This appropriation, while keeping the natives from starving, made an important change in their fiscal relations. Heretofore the native could expend his earnings as he pleased. After the appropriation, however, the earnings were sequestered by the agents, and the natives had no voice whatever in the expenditure of the money for which they toiled. Each native was allotted articles of necessity to a certain amount each week payable from his wages, and after the latter were expended the appropriation was drawn upon at the same rate until another sealing season intervened.

This practice exists to-day. The natives now receive $1 for each skin taken, in addition to the annual appropriation of $19,500. Their total income from taking seals and foxes, with the appropriation, was last year about $34,000, or somewhat more than $100 for each person.

The system of distribution of these earnings is one of pure communism. The native men are divided into about four classes, according to ability in taking seals. The members of each class receive a like sum, those in the first class being given more than those in the second, and so on to the fourth class, the lowest, which embraces apprentices. These sums, whatever they may be, are credited to each native and are drawn upon each week by orders on the store issued by the agent to the head of each family, the amount of the order varying with the size of the family. This plan of compensation, while assuring provision for the natives' immediate needs, is highly objectionable when considered from a sociological standpoint, its weakness being that it reduces all to a common level. It prevents that progress that accrues from the cultivation of superior skill or greater self-denial, and makes a virtual almshouse of the Pribilof reservation by dealing with the inhabitants as indigents. It requires willing service of the native, but takes from him his wage and expends it for his benefit without his consent. Incentive to increased individual efficiency is lacking because effort to that end is fruitless in bringing any greater benefit than if it had not been made.

It is reasonable to assume that the Government, while operating on the seal islands for its own profit, at the same time desires to better the condition of the native residents upon whose efforts it must depend

for successful conduct of its business. The first step in that direction is to do away with the appropriation of Congress for their support and to increase the wage earned through the taking of skins to a sum at least equal to the amount necessary for their maintenance. This would at once eliminate the objectionable element of charity in the present system and allow each man to support himself and family from his own earnings. Such a course is in my opinion not only an act of simple justice, the consummation of which would, moreover, involve no additional expense to the Government, but would go far toward increasing the moral tone of the native, by making him more self-reliant and self-respecting. It can be taken without additional legislation, the Secretary of Commerce and Labor now having the power under existing law to fix the natives' compensation for taking skins.

SCHEME OF COMPENSATION OF NATIVES.

The scheme of compensation embodied in the foregoing recommendations may be summarized as follows:

1. The appropriation for natives' support to be discontinued.
2. For natives' labor an allotment should be made of, say, $3 for each sealskin.
3. The moneys thus derived should be formed into a general fund, which should be prorated among all the natives of both islands.
4. This fund, by agreement with the natives, to be used for their support at the rate of a certain weekly amount based upon the number of mouths in each family.
5. The balance or remainder of each native's account at the close of each year to be paid to the native in cash.

It must be understood that the native is restricted by his work to the seal islands and can not go forth to pursue any other vocation, be it more or less profitable. It is not fair to this laborer to deny him all progress in the world and to confine him in his necessarily restricted sphere to such compensation only as permits the bare necessaries of life to him and his family. Whatever a corporation having a lease of the sealing privilege may have done, the United States Government ought not to put its laborer into the condition of constant and continuous vassalage with all progress denied him.

NATIVES ON THE ALEUTIAN ARCHIPELAGO.

The Aleut race is not found on the mainland, but inhabits the Aleutian Archipelago and several of the islands along the coast of the Alaskan Peninsula. It was never numerous and now embraces probably fewer than 1,000 souls, whose numbers are decreasing rapidly from disease and insufficient food. Some action should be taken to ameliorate their condition.

When discovered by the Russians in the eighteenth century, these Aleuts were a hardy race of fishermen and aquatic hunters. In their tiny bidarkis or skin boats they made long journeys and in them successfully weathered storms that would have sent the European rowboat to the bottom. They subsisted upon fish and the flesh of such warm-blooded animals as they could capture.

Being a tractable race, except when goaded to desperation, they were at once made use of by the Russians as hunters of the sea otter, which was the fur the white men most eagerly sought. Whole fleets of bidarkis with hundreds of native hunters would be transported hundreds of miles from their homes, and thence with a little food supplied them were put to sea to buffet with the storms of the northern ocean which withal were not so greatly feared by the natives as were their white masters. Thousands of them never returned.

Aleuts in numbers were taken to Sitka by the Russians as hunters and laborers, and kept there until they died. Entire fleets of bidarki hunters were loaned by the Russian company to foreign vessels to hunt sea otter, the profits of the venture being shared equally by the vessel and the company. The ship was required to pay the Russian company about 200 Mexican dollars for every Aleut lost at sea or killed by coast Indians. In 1805, 20 bidarkis were fitted out at Kodiak and with a colony of natives were taken to San Quinten bay in Lower California, where they were required to hunt for fur seals. This colony struggled on until 1841, when it was abandoned.

In the draft of the terms upon which the Russian-American Company should receive an extension of its charter, after its expiration in 1861, or thereabouts, the following paragraph is found:

> 10. The Aleuts and other peaceful natives within the colonies are relieved from compulsory labor on behalf of the Russian-American Company. They shall be allowed to settle in localities which they may find convenient, and shall be free to absent themselves from the places of their residence, subject only to such rules of police as may be established by the board of administration of the colonies.

This clause in the proposed charter was inserted to cure abuses in respect to the treatment of natives reported by Golovnin and the creole Kashevarof. In short, the Government would renew the charter only under such terms as the company would not accept.

When the Russian-American Company acquired control of Alaska the Aleuts were paid nothing for sea-otter skins, but in lieu of compensation received subsistence and "exemption from imperial taxes and dues." When this practice was forbidden by the Emperor Alexander I and the company instructed to pay the natives for every skin deposited by them with the company the natives received for every sea otter 10 rubles in leather scrip, the equivalent of $2, but each hunter was required to furnish his own subsistence. The company sold the sea-otter skins for at least $100 each.

Upon the occupation of the territory by Americans, the native from a condition of abject misery and want was plunged into a state of affluence of which he knew not how to take advantage. Rival trading companies established stations along the coast where sea otters abounded, and bid eagerly for the furs brought in by the native hunters. But while paying him liberally for the skins, the traders adroitly exposed for sale in the stores articles of sheer luxury to tempt the native's cupidity and encourage him to expend the money received for his skins. During the seventies and eighties the Aleut sea-otter hunter clothed his women in satins and silks of the gaudiest colors; his hut contained a brussels carpet and a parlor organ; his church received large donations; in short, a great deal of his earnings was expended at once for luxuries and he was forced to hypothecate his next year's catch of skins to obtain supplies to support his family during the winter.

With the commercial disappearance of the sea otter, however, the native again relapsed into a condition of penury bordering on starvation. Whereas in the days of plenty he lived on tinned meats and luxuries from the trader's store, now to sustain life he was driven again to fish and to hunt. Having contracted the vice of drunkenness, even in his poverty he would barter his skins for rum, or for sugar and flour with which to make the Russian strong beer. Disease sapped his vitality and decimated his villages.

Such practically is the condition to-day of the native on the Aleutian chain. While formerly he had to subsist upon what he could wrest from nature, he was then as free from the vices of civilization as he is now of its saving benefits. His contact with the white race has encouraged appetites of which the native was previously ignorant and has taken away his self-reliance and ability to cope with his surroundings. In his state of poverty, the furs he is still able to gather are the object of desire of small traders, who visit his settlements annually and exchange trade goods for furs. The native has no resource but to part with his furs at such prices as the trader may wish to give.

Unless the Government takes active measures this interesting race of people will become extinct. And since the Government is trying to save species of the lower animals which are threatened with that calamity, it would seem proper that similar attention should be paid to a race of human beings which is rapidly disappearing. A simple and yet it is believed an effective plan to accomplish this end is offered and earnestly recommended to the attention of the Department:

1. The entire Archipelago to be made a special reservation. This can be accomplished without difficulty or friction. There are no vested rights in the entire range of islands, so far as known, except

at Dutch Harbor, a small portion of which has been surveyed and patented. The property of the Alaska Commercial Company at Unalaska is built on a Government reservation on which it has only squatter's rights. For its buildings it should receive compensation.

The islands in this chain are devoid of timber. Coal or minerals have appeared only in too small quantities to justify exploiting. Agriculture on any scale to support life is impossible. Grazing is impracticable. There are no good harbors except at Dutch Harbor and Unalaska. Fish are plentiful but the streams are so small that commercial fishing will not pay. In short, there exists no good reason why these islands should not be set apart for the use of those aboriginal inhabitants claiming them as their native land.

2. Trading by private persons or corporations to be prohibited.

3. The Government to maintain a station at each principal settlement, of which there are not over five. Each station to contain a store and a school, with a storekeeper and school-teacher, the whole to be under the supervision of a general agent.

4. The storekeepers should buy the natives' peltries and such other articles as they may have for sale, including baskets, at a fair price; the native should be encouraged to self-support and thrift.

5. Small fishing stations could be maintained, the product of which could be marketed for natives' account.

This plan can be worked out and operated with little trouble and expense. Without some provision of this nature the Aleuts on the Archipelago will be wiped out by disease and lack of food. With the Government willingly expending thousands of dollars to prevent extermination of the lower animals, surely no justification is needed for expenditure to prevent the extinction of a race of men who were hardy and self-reliant until brought into contact with European races.

MANUAL TRAINING FOR NATIVES.

During the Russian occupation certain native youths exhibiting special aptitude were trained in the useful arts, such as carpentry, boat building, iron and copper working, etc.

But those natives so educated in Russian times have nearly all died, and the new generation can not build its own houses or boats. No training of this character, although greatly needed, has been provided by our Government.

Some arrangement should be made to teach the Aleuts how to work at other employments than their natural one of hunting. A teacher of the useful trades should be provided on each of the Pribilof Islands. A small school could also be established at Unalaska, and the young men from the entire archipelago sent there for a course of instruction. I recommend this to careful consideration.

FIRE PROTECTION FOR PRIBILOF ISLANDS.

The villages of St. Paul and St. George are entirely without fire protection, and with the high winds that prevail are fortunate indeed in never having had a disastrous conflagration. Aside from the money loss entailed, such a contingency, should it occur in winter and destroy the food supply in the warehouses, would probably result in the starvation of the inhabitants. Native dwellings have been ignited by overturned kerosene lamps and in one case a whole native family while asleep was asphyxiated by fire in the interior of their house. In every case so far, however, the blaze has been discovered and extinguished before it could take serious hold upon the framework of the building.

I strongly urge the provision of adequate fire protection for both islands. The isolation of the locality demands that some means be supplied for the prevention of conflagration, which there would be a catastrophe. The investment of a small amount for this purpose would be sufficient to provide protection for years, and would be the cheapest fire insurance that could be obtained. Should these buildings burn, the business not only would be seriously interfered with, and the native and white inhabitants threatened with starvation, but the Government would lose the amount of its investment and be obliged to spend twice as much to replace the plant as was paid for it.

As to means, chemical apparatus could be used in summertime, but would be of little avail in winter because of the likelihood of freezing while not in use.

In winter, running water under pressure would be the only resort. Running water is not available at present, but could be supplied by any of the following means:

On St. Paul.—1. Sea water could be pumped through a small standpipe by a gasoline engine and distributed through mains in the village.

2. Fresh water from a lake a mile away could be piped to the village by pumping, and held in a large reservoir of sufficient capacity to furnish fresh water not only for fire protection but for natives' use.

3. Water from wells a half mile from the village could be pumped and used in the same manner as in suggestion 2.

On St. George.—1. Salt water could be pumped as in the preceding suggestion 1.

2. The water system already in use there, whereby water is brought by gravity and siphoning from a lake to the village, could be adapted to furnish a stream that would reach over any native dwelling and probably any larger warehouse or dwelling.

THE SALMON FISHERIES OF THE PACIFIC COAST

By John N. Cobb
Assistant Agent at the Salmon Fisheries of Alaska

Bureau of Fisheries Document No. 751

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THE SALMON FISHERIES OF THE PACIFIC COAST

By John N. Cobb,
Assistant Agent at the Salmon Fisheries of Alaska.

INTRODUCTION.

The most valuable commercial fisheries in the world, excepting only the oyster and herring fisheries, are those supported by the salmons. Of these the most important by far are the salmon fisheries of the Pacific coast of North America, where California, Oregon, Washington, and Alaska, including also British Columbia, possess industries representing millions of dollars of investment and millions of output annually. No published reports contain data for the entire coast, or have pertained to the same year for both Alaska and the States. In the following pages, containing the returns from a canvass occupying several months, the data are complete for the United States coast and Alaska for the year 1909, and to make the report more comprehensive, historical and geographical aspects of the subject, as well as methods of the fisheries and allied industries, are discussed at some length. Figures for British Columbia have been included also, so far as possible, the official reports of the Dominion of Canada and of the Province itself having been drawn upon for this purpose. The statistics for Alaska are taken from the already printed (1909) report of Mr. Millard C. Marsh and the present writer.[a]

[a] The fisheries of Alaska in 1909. By M. C. Marsh and J. N. Cobb, agents at the salmon fisheries of Alaska. Bureau of Fisheries Document No. 730. 1910.

I. THE SPECIES OF SALMON AND THE RUNS.

The Pacific coast salmons are all included in the genus *Oncorhynchus*. With them the fishermen incorrectly class the steelhead trout, which really belongs to the closely related genus *Salmo*.

As long ago as 1731 the species of *Oncorhynchus* were first made known by Steller, who, almost simultaneously with Krascheninikov, another early investigator, distinguished them with perfect accuracy under their Russian vernacular names. In 1792 Walbaum adopted these vernacular names in a scientific nomenclature for these fishes.

Five species of salmon (*Oncorhynchus*) are found in the waters of the north Pacific, ranging northward from Monterey Bay on the American coast and Japan on the Asiatic, the extreme northern distribution of certain of the species having not yet been accurately determined. The five species are: (1) *Oncorhynchus tschawytscha*, quinnat, tyee, chinook, spring, or king salmon; (2) *Oncorhynchus nerka*, blueback, red, sukkegh, or sockeye salmon; (3) *Oncorhynchus kisutch*, silver, coho, or white salmon; (4) *Oncorhynchus keta*, dog or chum salmon; and (5) *Oncorhynchus gorbuscha*, humpback or pink salmon.

CHINOOK, QUINNAT, OR KING SALMON.

The largest, best known, and most valuable of these is the chinook or king salmon (*O. tschawytscha*). It is found throughout the region from the Ventura River, Cal., to Norton Sound, Alaska, and on the Asiatic coast as far south as northern China. As knowledge extends, it will probably be recorded in the Arctic.

In the spring the body is silvery, the back, dorsal fin, and caudal fin having more or less of round black spots, and the sides of the head having a peculiar tin-colored metallic luster. In the fall the color is, in some places, black or dirty red. The fish has an average weight of about 22 pounds, but individuals weighing 70 to over 100 pounds are occasionally taken. One was caught near Klawak, Alaska, in 1909, which weighed 101 pounds without the head. The Yukon River is supposed to produce the finest examples, although this supposition is not based on very reliable observations. The southeast Alaska fish average as high as 23 pounds in certain seasons, followed by an average of about 22 pounds in the Columbia River, and about 16 pounds in the Sacramento.

In most places the flesh is of a deep salmon red, but in certain places, notably southeast Alaska, Bristol Bay, Puget Sound, and British Columbia, many of the fish, the proportion being sometimes as much as one-third of the catch, have white flesh. A few examples have been taken with one side of the body red and the other white, while some are found with mottled flesh. No reasonable explanation of this phenomenon has yet been given.

In its southern range the quinnat strikes in at Monterey Bay in sufficient numbers to justify commercial fishing about the middle of April, where it is seen feeding upon the inshore moving schools of herring and sardines, continuing until in August. There are two runs of spawning fish in the Sacramento, the first or "spring run" beginning in April and continuing throughout May and June, these fish spawning mainly in the cold tributaries of the Sacramento, such as the McCloud and Fall Rivers. The second or "fall run" occurs in August, September, and October, and these fish spawn in the riffles in the main river between Tehama and Redding, also entering the tributaries in that vicinity. The two runs merge into each other. It is also claimed that there is a third run which comes in December.

In former years the San Joaquin and the American and Feather Rivers of the Sacramento system had large runs of salmon, but excessive fishing and the operation of various mining and irrigation projects have practically depleted them.

The Eel and Mad Rivers of northern California have only a late or fall run, while the Klamath River has both a spring and a fall run, and Smith River has a spring run alone. Rogue River in Oregon has both a spring and a fall run, and the Umpqua and several other coast streams of Oregon have small early runs.

The Columbia River has three runs, the first entering during January, February, and March, and spawning mainly in the Clackamas and neighboring streams. The second, which is the best run, enters during May, June, and part of July, spawning mainly in the headwaters. The third run occurs during late July, August, September, and part of October, and spawns in the tributaries of the lower Columbia.

In Puget Sound chinook salmon are found throughout the year, although it is only during the spawning season that they are very abundant. In the Fraser River, a tributary of the Sound, the run occurs from March to August.

In the Skeena River, British Columbia, the run occurs from May to July, the same being approximately true of the Nass also.

In southeast Alaska they are found all months of the year. From March to the middle of June they are abundant and feeding in the numerous straits and sounds; in May and June the spawning fish enter the Unuk, Stikine, Taku, Chilkat, Alsek, and Copper Rivers

in large numbers, and in a few smaller streams in lesser abundance. In August, September, and October they are again to be found in large numbers feeding in the bays and sounds, while during the winter months a few have been taken on trawls set for halibut, showing that they are living in the lower depths at this time.

In Cook Inlet the run occurs during May and June and is composed wholly of red-meated fish; in the rivers of Bristol Bay the run comes in May and June, and the same is true of the Togiak, Kuskokwim, and Yukon Rivers, although fish may be seen in the upper courses of the Yukon in July, the lateness here being due to the immense distance the fish have to cover.

On the Asiatic side the chinook is found in some of the rivers of Siberia.

SOCKEYE, BLUEBACK, OR RED SALMON.

The sockeye or blueback salmon (*O. nerka*), which forms the greatest part of the canned salmon of the world, when it first comes in from the sea is a clear bright blue above in color, silvery below. Soon after entering the river for the purpose of spawning the color of the head changes to a rich olive, the back and sides to crimson and finally to a dark blood red, and the belly to a dirty white. The maximum weight is about 12 pounds, and length 3 feet, with the average weight about 5 pounds, varying greatly, however, in different localities. Observations of Chamberlain [a] in Alaska show that the average weight of a number of sockeyes taken from Yes Bay was 8.294 pounds, while the average weight of a number from Tamgas was only 3.934 pounds. Evermann and Goldsborough [b] report as a result of the weighings of 1,390 red salmon, taken from as many different places in Alaska as possible, an average weight for the males of 7.43 pounds; for the females, 5.78 pounds; or an average weight for both sexes of 6.57 pounds. A run of small, or dwarf, males accompanies certain of the main runs, these being especially noticeable in the Chignik lagoon, Alaska, run. This species usually enters streams with accessible lakes in their courses.

A few specimens of the sockeye have been taken as far south as the Sacramento River. In Humboldt County, Cal., small runs are said to occur in Mad and Eel Rivers. Only an occasional specimen appears in the coastal streams of Oregon. The Columbia is the most southern river in which this species is known to run in any numbers, entering the river with the spring run of chinooks. From here south the species is called blueback exclusively. A considerable run enters the Quinniault River, Wash., and there is also a small run in Ozette Lake, just south of Cape Flattery.

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[a] Some observations on salmon and trout in Alaska. By F. M. Chamberlain, naturalist, U. S. Fisheries Steamer Albatross. U. S. Bureau of Fisheries Document no. 627, p. 80.

[b] The fishes of Alaska. By B. W. Evermann and E. L. Goldsborough. Bulletin Bureau of Fisheries, vol. XXVI, p. 257.

In the Puget Sound region, where it is known as the sockeye, this species ascends only the Skagit River in commercial numbers, although a small run appears in the Lake Washington system of lakes and, possibly, in the Snohomish, Stillaguamish, and Nooksack Rivers.

The greatest of all the sockeye streams is the Fraser River, British Columbia, and this stream has been famous from very early days for its enormous runs of this species, a peculiar feature of which is that there is a marked quadrennial periodicity in the run. The maximum run occurs the year following leap year, the minimum on the year following that. The greater part of the catch of the Puget Sound fishermen is made from this run as it is passing through Washington waters on its way to the Fraser. The fish strike in during July and August on the southwest coast of Vancouver Island, apparently coming from the open sea to the northwest. They pass the Straits of Juan de Fuca, Rosario, and Georgia, spending considerable time in the passage and about the mouth of the river. Small numbers run as early as May and as late as October, but the main body enters about the first week in August.

The sockeye occurs in most of the coastal streams of British Columbia, and is usually the most abundant species. The principal streams frequented are the Skeena, Rivers Inlet, Nass, Lowe Inlet, Dean Channel, Namu Harbor, Bella Coola, Smith Inlet, Alert Bay, and Alberni Canal.

In Alaska, where this fish is generally known as the red salmon, it is abundant and runs in great numbers in all suitable streams, of which, in southeast Alaska, the following are the most important: Boca de Quadra, Naha, Yes Bay, Thorne Bay, Karta Bay, Nowiskay, Peter Johnson, Hessa, Hetta, Hunter Bay, Klawak, Redfish Bay, Stikine, Taku, Chilkoot, Chilkat, Alsek, Seetuck, Ankow, etc.; in central Alaska, Copper, Knik, Kenai, Sushitna, Afognak, Karluk, Alitak, Chignik; in the Bristol Bay region, the Ugashik, Ugaguk, Naknek, Kvichak, Nushagak, and Wood. It is also supposed to occur in the Togiak, Kuskokwim, and Yukon Rivers, which debouch into Bering Sea, and probably occurs in the Arctic streams of Alaska. The run in Alaska begins usually in June and extends usually to the middle of August. It begins earlier in Prince William Sound, and sometimes extends into September in southeast Alaska.

On the Asiatic side the species is known to occur at Bering Island and in all suitable streams south to Japan, where it is found landlocked in Lake Akan, in northern Hokkaido.

SILVER OR COHO SALMON.

The silver or coho salmon (*O. kisutch*) is silvery in spring, greenish on the upper parts, where there are a few faint black spots. In

the fall the males are mostly of a dirty red. The flesh in this species is of excellent flavor, but paler in color than the red salmon, and hence less valued for canning purposes.

This species has a maximum weight of about 30 pounds, with a general average of about 6 pounds.

The silver salmon is found as far south as Monterey Bay, where it appears during the month of July and is taken by the trollers. From Eel River, in California, north, it is found in most of the coastal streams. It usually appears in July and runs as late as November, the time of appearance and disappearance varying somewhat in different sections. Owing to its late appearance comparatively few, and they usually in the early part of the season, are packed by the canneries, most of which shut down in July and August. This fish also tarries but a short time about the mouth of the stream it is to enter, and is wary of nets, which makes it rather unprofitable to fish for the latter part of the season when it is running alone.

On the Asiatic side the coho ranges down the coast to Japan.

HUMPBACK OR PINK SALMON.

The humpback or pink salmon (*O. gorbuscha*) is the smallest of the American species, weighing from 3 to 11 pounds, the average being about 4 pounds. In color it is bluish above, silvery below, the posterior and upper parts with many round black spots, the caudal fin always having a few large black spots, oblong in shape. The males in fall are dirty red and are very much distorted in shape, a decided hump appearing on the back, from which deformity the species acquires its name. The flesh is softer than in the other species; it is pale in color, hence its canned name, " pink " salmon.

The southern limit of the fish is the Sacramento River, but only occasional specimens are found here and in the rivers to the northward until Puget Sound is reached. Here a large run appears every other year, the only place on the coast where such is the case.

The humpback occurs in varying abundance in the waters of British Columbia, but it is in the waters of southeast Alaska that it appears in its greatest abundance. Many of the canneries in this region depend mainly upon the humpback for their season's pack, and the canned product now occupies an excellent position in the markets of the world. The fish spawn in nearly all of the small, short streams.

In central and western Alaska the runs are much smaller and the humpback is not much sought after by the cannery men, who are usually able to fill their cans with the more valuable species.

On the Asiatic side it is found in the rivers of Siberia (abundant in the Amur), but not in Japan.

In southeast Alaska the run begins in June and continues until September, or even later in some places. In western Alaska the period is somewhat shorter. In Puget Sound it continues until late in the fall.

DOG OR CHUM SALMON.

The dog or chum salmon (*O. keta*) reaches a maximum weight of 16 pounds, the average being about 8 pounds. When it first appears along the coast it is dirty silvery, immaculate or sprinkled with small black specks, the fins dusky, the sides with faint traces of gridironlike bars. Later in the season the male is brick red or blackish, and its jaws are greatly distorted. Its flesh is quite pale, especially when canned, when also it is mushy in texture. It is especially good for freezing, salting, and smoking.

This species has a wide distribution. It is found as far south as San Francisco, but is not utilized commercially in California except on Eel River. It is found in most of the coastal streams from here north, being especially abundant from Puget Sound northward to southeast Alaska, both inclusive. In this region it is being utilized in greater abundance each year, as the market for it widens.

In central, western, and arctic Alaska the species occurs in varying abundance, but is utilized sparingly, except by the natives, with whom it is the favorite species dried for winter food.

This is the most abundant species of salmon in Japan, where it is called sake, and large quantities are dry-salted each year. In Siberia the species is abundant and is known as kaita or kita.

The run of dog salmon comes later than that of any other species except the coho. In Alaska it begins in June, but the height of the season does not occur until late in August or early in September, and fish are found as late as November. In Puget Sound they run from about the middle of August till late in November, and practically the same is true in the Columbia River.

STEELHEAD TROUT.

The steelhead trout (*Salmo gairdneri*) is commonly classed as one of the salmons by the fishermen of the Pacific coast, and it has been included in this report on this account. In different localities the average weight is placed at from 8 to 15 pounds, while extreme sizes reach 45 pounds. The excellent quality of its flesh causes it to be highly prized for the fresh market, but owing to its pale color only limited quantities are canned.

The principal center of abundance of this species is the Columbia River. It is found from Carmel River, Cal., north to central Alaska, and possibly has an even wider range in Alaska. It seems to be found in the rivers during the greater part of the year. In the Columbia River the spawning season is from February to May, in Puget Sound in the spring, and in southeast Alaska in May and June. The best commercial fishing is in January, February, and March. In California the catching of this species is restricted to hook and line fishing.

II. FISHING GROUNDS AND HISTORY OF THE FISHERIES.

WASHINGTON.

Puget Sound.—Strictly speaking, the name Puget Sound should be restricted to that long, narrow arm extending south from the Strait of Juan de Fuca, but a practice has developed, and is now common among fishermen and others, of designating all the great water area in the State of Washington comprising Puget Sound proper, Strait of Juan de Fuca, Canal de Haro, Rosario Strait, the Gulf of Georgia, and the smaller straits, bays, and sounds, as Puget Sound, and this practice, for convenience sake, has been followed in this report.

This great indentation in the coast, with its numerous islands and many fine harbors, has greatly aided the development of this portion of Washington and has been especially favorable to the prosecution of the salmon and other fisheries. Numerous rivers and creeks enter the Sound, the more important of these being on the eastern shore and comprising the Nooksack, Skagit, Stillaguamish, Snohomish, Duwamish, Puyallup, and Nisqually. On the southern and western shores the tributary streams are nearly all small, the more important being the Skohomish, Quilcene, Dungeness, and Elwha.

The first fishing operations by white men were begun soon after the settlement at what is now known as Seattle, about 1852. For many years the catch was sold either fresh or salted. The first salmon cannery on Puget Sound was erected in 1877, at Mukilteo, in Snohomish County. The first pack was of 5,000 cases, composed wholly of silver or coho salmon. Later this plant put up the first humpbacks ever canned. In 1880 the cannery was removed to West Seattle. In 1885 other canneries were erected at Mukilteo, Seattle, Tacoma, and Clallam Bay, most of them packing silver and humpback salmon alone. The first sockeye salmon cannery was established at Semiahmoo, in Whatcom County, in 1892, from which time on the industry fluctuated considerably, 15 canneries being operated in 1910.

Quillayute River.—This is a small stream, about 30 miles in length, which flows through the southwestern part of Clallam County and empties directly into the ocean. The Quillayute Indian Reservation is located here and the natives catch some salmon and market them on Puget Sound.

Quiniault River.—This river, which enters the ocean in the northwestern part of Chehalis County, has a length from the ocean to Quiniault Lake of about 40 miles, wholly within the boundaries of the Quiniault Indian Reservation. Fishing is restricted to the Indians and the catch is generally shipped by rail to Hoquiam and Aberdeen, on Grays Harbor, and sold to the dealers at these places.

Grays Harbor.—This is the first important indentation on the coast of Washington south of Cape Flattery. It is about 40 miles long from east to west and about 20 miles wide in the widest part. The principal tributary is the Chehalis River, but there are a number of small streams which debouch into the harbor.

As early as 1878 there was a cannery on Grays Harbor, but from then until 1891 the data relating to this branch of the industry are very meager. In 1910 two canneries were in operation at Aberdeen and Hoquiam, respectively.

Willapa Harbor.—The entrance to this harbor, which also includes Shoalwater Bay, is about 27 miles south of Grays Harbor. The harbor runs east and west and is about 25 miles long. Shoalwater Bay extends south from it a distance of about 30 miles; its southern portion ending about a mile from the Columbia River, and on the western side being separated from the ocean by a spit varying in width from three-fourths to 1 mile. The bay is shallow, excepting in the main channel. The principal salmon streams entering the harbor are the Nasel and North Rivers, in which most of the pound or trap nets are located.

Data relating to the early history of the fisheries of this section are very meager. In 1887 there were four canneries in operation, probably the largest number ever operated. In 1910 there was but one—at South Bend.

COLUMBIA RIVER.

The Columbia, which is the largest river of the Pacific coast, rises in British Columbia, flows through Washington, reaching the northern border of Oregon about 75 miles west of the State's eastern boundary; from this point the river forms the dividing line between Oregon and Washington, its general course being westerly. It empties into the Pacific at Cape Disappointment. Its principal tributaries are the Snake, John Day, Deschutes, and Williamette Rivers, and through these the main river drains an enormous extent of territory.

This river, which has produced more salmon than any other river in the world, has had a most interesting history. Many years before the white man saw its waters the Indians visited its banks during the annual salmon runs and caught and cured their winter's supply of food. It was about the year 1833 that a small trading sloop, under the command of Capt. Lamont, came into the Columbia

River on one of her regular trips and dropped anchor near what is now known as St. Helens. While waiting several months for a return cargo the captain salted a number of barrels of chinook salmon, using old Jamaica rum kegs for the purpose. This is the first record of the export of this toothsome fish.

In 1861, H. N. Rice and Jotham Reed began packing salted salmon in barrels at Oak Point, 60 miles below Portland. The first season's pack amounted to 600 barrels. The venture proved fairly profitable and was soon participated in by others.

In the spring of 1866 William Hume, who had assisted in starting the first salmon cannery in the United States, on the Sacramento River, in 1864, finding the run of fish in the latter stream rather disappointing, started a cannery on the Columbia at Eagle Cliff, Wash., about 40 miles above Astoria. Then the river literally swarmed with salmon, and the cannery had no trouble in packing 4,000 cases, which it increased to 18,000 the next year and to 28,000 cases in 1868. In 1867 a crude cannery on a scow was started by S. W. Aldrich, who did all the work, from fishing to canning, himself. In 1868 a cannery was built near Eagle Cliff by one of the Humes, and from this time on for a number of years the industry grew by leaps and bounds.

The banner year in the canning industry was 1884, when 620,000 cases of chinook salmon were marketed. At this time the runs were so enormous that tons and tons of salmon were thrown overboard by the fishermen because the canneries were unable to handle them.

At the present time (1910) there are 10 canneries in operation on the river, while large quantities of salmon are also frozen, mild cured, pickled, smoked, and sold fresh in the markets of the world.

Commercial fishing is carried on mainly between the mouth of the Columbia and Celilo, a distance of about 200 miles, and in the Willamette River. The most of it is in the lower part of the river, within about 40 miles of its mouth. Bakers Bay, on the Washington or north side, and just within the river's mouth, is the favorite ground for pound-net fishing. The principal gill-net drifting ground is from the river's mouth to about 20 miles above Astoria, but drifting is done wherever convenient reaches are found much farther up the river. Most of the drag seines are hauled on the sandy bars in the river near Astoria, which are uncovered at low water. Wheels are operated in the upper river above the junction of the Willamette with the main river.

Astoria is the principal center for all branches of the industry, but more especially for canning. Other places in addition to Astoria at which canneries are located are Ilwaco, Eagle Cliff, Altoona, Brookfield, Pillar Rock, Cathlamet, on the Washington shore, and at Warrendale, Rooster Rock, and Seuferts, on the Oregon shore.

OREGON.

Necanicum Creek.—This short stream is in Clatsop County and enters the Pacific Ocean about 10 miles south of the Columbia River. Its fisheries are of small importance.

Nehalem River.—The Nehalem is a small coastal river that rises in the mountains of Clatsop and Columbia Counties, and flows into the Pacific Ocean in the northern part of Tillamook County. As early as 1887 there was a small cannery here, and the business has been followed ever since.

Tillamook Bay and River.—Tillamook River is a very short stream which enters Tillamook Bay, the latter being in Tillamook County and about 45 miles south of the mouth of the Columbia River.

Fishing is carried on mainly in the bay. The earliest record we have of canneries on this bay is of 1886, when two were in operation. Since 1891 but one has been operated.

Nestucca River.—This stream enters the ocean in the southwestern part of Tillamook County. A cannery operated here in 1887 and the business has been carried on intermittently since then.

Siletz River.—This river has its source in the mountains of Polk County, and enters the ocean in the northern part of Lincoln County. The commercial development of the fisheries was hampered for many years owing to the fact that the river was within the boundaries of what was then the Siletz Indian Reservation. The first cannery was established here in 1896.

Yaquina Bay and River.—The Yaquina ("crooked") River is about 60 miles long; its general course is nearly west through the county of Benton. The river is narrow throughout the greater part of its length. A few miles from its mouth it suddenly broadens out into an estuary from one-half to three-fourths of a mile wide which is commonly called Yaquina Bay. The river enters the Pacific about 100 miles south of the Columbia.

Salmon canning was begun on this river in 1887, when two small canneries were constructed. The next year an additional plant was erected. The business has fluctuated considerably since then and there is now but one cannery.

The fishing grounds are all in the bay and the lower section of the river. The fishermen of this section are fortunate in that they have railroad communication with the outside world, the only place on the ocean side of Oregon, except Tillamook, so situated.

Alsea Bay and River.—Alsea River rises in the southwestern part of Benton County, and flows in nearly a northwesterly direction to the Pacific, a distance of about 60 miles. Like the Yaquina, the "bay" is merely a broadening out of the river just inside its mouth.

The first cannery was established in 1886 and by 1888 there were three in operation. For many years past but one has been in operation.

The best fishing grounds are from the mouth of the river to about 5 miles inland.

Siuslaw River.—This river has its source in the mountains of Lane County, and its course lies first in a northwesterly direction and to the westward until the Pacific is reached. Through part of its course it is the dividing line between Lane and Douglas Counties.

As early as 1878 there were two canneries operated on this river, but from 1879 till 1888 there are no data available showing the extent of the fisheries. At present there are two canneries in operation.

The salmon fishing grounds extend from near the mouth of the river to about 20 miles upstream.

Umpqua River.—With the exception of the Columbia this is the largest and longest river in Oregon. It is formed by north and south forks, which unite about 9 miles northwest of Roseburg, and the river then flows northwestwardly and enters the Pacific. Practically all of this river is within the boundaries of Douglas County, one of the largest counties in the State. A railroad is now being built along this river and when this is completed there will doubtless be a large development of the fisheries of this region owing to the opportunities which will then be offered for shipping fresh fish.

As early as 1878 there were two canneries located on the Umpqua. The number has never been larger than this, and usually there has been but one operating. In 1910 there was but one, at Gardiner.

Coos Bay and River.—Coos Bay is a navigable semicircular inlet of the ocean with numerous arms or branches. There is much marshy ground in the bay, and a number of sloughs, or small creeks, which empty into the bay from both sides. Coos River proper is an unimportant stream, but a few miles in length. North Bend, Marshfield, and Empire are the principal towns on the bay. A branch railroad is being built to these points from the main line of the Southern Pacific Railway, and as soon as this is completed the fishing industry will receive a great impetus. Heretofore this region has depended upon steamers and sailing vessels plying to Portland and San Francisco for its communication with the outside world, and this slow and infrequent means of shipment has very seriously handicapped the fisheries.

Salmon canning began here in 1887, when two canneries opened for business. The business has fluctuated considerably since, most of the time but one cannery being operated, and such being the case in 1910.

Fishing is carried on mainly in the bay. A few set nets are operated in the river.

Coquille River.—This river is formed by three branches, called the North, Middle, and South Forks, which rise in the Umpqua Moun-

tains and unite near Myrtle Point, the head of tidewater, about 45 miles by river from the mouth of the stream. It is a deep and sluggish river, with no natural obstructions to hinder the free passage of fish. Its fisheries have been seriously hampered by the lack of railroad communication, but this will be remedied, as the railroad to Coos Bay will eventually connect with a short line now in existence between the Coquille and Coos Bay.

The principal towns on the Coquille River are Bandon, Prosper, Coquille, and Myrtle Point. Bandon is the shipping port.

Pickled salmon were cured and shipped from this river very early, the first recorded instance of any considerable quantity being in 1877, when 3,000 barrels of salmon were sent to San Francisco. The salt shipments were important until within recent years. The first salmon cannery was erected in 1883, at Parkersburg. In 1886 another was built at the same place, and the following year still another was erected close by. This was the largest number ever in operation in any one year. In 1910 two canneries were operated, both at Prosper.

The fishing grounds are from the mouth to Myrtle Point, about 45 miles inland.

Sixes River.—This small river is located in the northern part of Curry County, and is about 40 miles in length, entering the Pacific a very short distance above Cape Blanco. The salmon caught here are either salted or shipped fresh to the canneries on the Coquille River.

Elk River.—This is another small stream about 40 miles in length, which enters the Pacific just south of Cape Blanco. As on the Sixes River the salmon are either salted or sold fresh to the canneries on the Coquille River.

Rogue River.—This river has as its source Crater Lake in the Cascade Mountains, on the western border of Klamath County, flowing a distance of about 325 miles to the ocean, which it enters at Wedderburn. Its principal tributaries are the Illinois, Applegate, and Stewart Rivers. Owing to canyons and falls in the main river between the mouth of the Illinois River and Hellgate, the latter near Hogan Creek, which runs through the town of Merlin, navigation and fishing are impossible in that section. Except at the mouth of the river the population is very sparse until about the neighborhood of Hogan Creek, where the river approaches the railroad, and from here on for some miles there are numerous growing towns.

Owing to the fact of there being both a spring and a fall run of salmon in this river, the fisheries early became of importance, although sadly hampered because of being compelled to depend wholly on vessel communication with San Francisco, many miles away. In the early years the salmon were pickled and shipped to San Fran-

cisco. In 1877 Mr. R. D. Hume, who had been canning salmon on the Columbia River, removed to the Rogue River, and established near the mouth a cannery which he operated every season (except 1894, when the cannery burned down) until his death in November, 1908, since which date it has been operated by his heirs. Mr. Hume also operated a large cold-storage plant at Wedderburn for several years.

The development of the fisheries of the lower Rogue River was very much hampered by the monopoly which Mr. Hume acquired and maintained until his death. He bought both shores of the river for 12 miles from its mouth, and also owned an unbroken frontage on the ocean shore extending 7 miles north from the mouth of the river. As a result of this, independent fishermen could find no convenient places for landing, which was necessary in order to cure, handle, and ship the fish caught. Since Mr. Hume's death the property has been sold to various parties, but the people of Oregon, upon an initiative and referendum petition, voted in 1910 to close Rogue River to all commercial fishing.

In the upper river ranchers living along the banks have engaged in fishing for a number of years, the catch for the most part being sold fresh. In recent years, as the country has developed, this fishery has become fairly important.

Chetco and Windchuck Rivers.—These two unimportant streams empty into the Pacific in the lower part of Curry County, not far from the California line. The former is about 20 miles and the latter about 25 miles in length. Both have runs of salmon, and small fisheries have been maintained for some years, the catch being either pickled or sold to the California canneries.

CALIFORNIA.

Smith River.—This river, which is the most northerly one in the State, rises near the Siskiyou Mountains, and runs in a westerly direction to the Pacific Ocean.

The river has only a spring run of salmon, and the early recorded history of the fisheries is fragmentary. The pickling of salmon was the main business at first and has been important ever since, as the cannery, which was first established in 1878, operated irregularly, and seems to have shut down entirely in 1895.

Klamath River.—This is the most important river in California north of the Sacramento. It issues from the Lower Klamath Lake in Klamath County, Oreg., and runs southwesterly across Siskiyou County, passes through the southeastern section of Del Norte County, keeping its southerly course into Humboldt County, where it forms a junction with the Trinity River, and thence its course is directed to the northwest until it reaches the Pacific Ocean.

The Klamath River is important as a salmon stream because it has both a spring and fall run of salmon. In 1888 a cannery was established at Requa, at the mouth, and this has been operated occasionally ever since. The pickling of salmon has been done here for a number of years. Some years part of the catch has been shipped fresh to the cannery on Smith River, or to the Rogue River, Oreg., cannery.

Humboldt Bay and tributaries.—The shore line of Humboldt County is bold and high except in the vicinity of Humboldt Bay, where it is rather flat. The latter is the only harbor along the county shore, and it is quite difficult of access, owing to the bar at the entrance, upon which the sea breaks quite heavily. The bay is about 12 miles long and about 3 miles wide. Mad River, which has its rise in the lower part of Trinity County, runs in a northwesterly direction, then makes a sharp turn and enters the bay from the north side. Eel River, which has its rise in Lake County, far to the southeast, runs in a northwesterly direction and enters the bay at its southern extremity. Small railroads running south from Eureka traverse the shores of both rivers for some miles. A railroad to run from the north side of San Francisco Bay to Eureka is now nearing completion, and when in operation it will doubtless aid very materially in extending the market for salmon caught in these rivers.

Mattole River.—This is a small and unimportant river in the southern part of Humboldt County, and is said to have a good run of salmon each year, but no commercial fishing has as yet been carried on here.

Sacramento and San Joaquin Rivers.—These two rivers are the most important rivers in California. The Sacramento is quite crooked, the distance by river from Red Bluff to San Francisco being about 375 miles, while the distance by rail between these two places is only 225 miles. The river rises in several small lakes in the mountains about 20 miles west of Sisson, in Siskiyou County, and for nearly half its length flows through a narrow canyon. The upper portion is a typical mountain stream, with innumerable pools and rapids. A little above Redding the river emerges from the canyon and widens into a broad shallow stream. Below Sacramento it runs through a level country and is affected by tides. Sloughs are numerous in this stretch, some connecting it with the San Joaquin. The Sacramento and San Joaquin Rivers join as they empty into Suisun Bay.

The principal tributaries of the Sacramento which are frequented by salmon are the Pit and McCloud Rivers and Battle Creek. At one time salmon frequented the American and Feather Rivers, but mining and irrigation operations along these streams either killed them off or drove them away.

The San Joaquin River has its source in the Sierra Nevada Mountains. Flowing westerly and forming the boundary between Fresno and Madera Counties for a considerable distance, it then turns abruptly to the north just where it is joined by Fresno Slough, which drains Lake Tulare. From here its general course is northwesterly until it joins the Sacramento River, near the latter's mouth. The Chouchilla and Fresno Rivers are the principal tributaries of the San Joaquin.

The principal fishing grounds for salmon are Suisun Bay, the lower part of San Joaquin River, and the Sacramento River as high as the vicinity of Sacramento. Drift gill nets are used almost exclusively in this section. From Sacramento to Anderson there is considerable commercial fishing, more particularly with haul seines.

Owing to the early and excellent railroad facilities which the fisheries of the Sacramento River have enjoyed, they have not been handicapped so seriously as most of the other Pacific coast rivers in finding profitable outlets for the catch. Soon after the first transcontinental line was opened the shipping of fresh salmon to eastern points began and it has been an important feature of the industry ever since.

The chief event in the history of the salmon fisheries of this river is the fact that the canning of salmon on the Pacific coast had its inception here in 1864. The circumstances leading up to this event and its consummation are interestingly told by Mr. R. D. Hume in the following words:

The first salmon cannery of the United States was located at Washington, Yolo County, Cal. A part of the building was originally a cabin situated on the river bank outside of the levee just opposite the foot of K Street, Sacramento city. It was built in 1852 and occupied by James Booker, Percy Woodsom, and William Hume. William Hume came to California in the spring of 1852, bringing with him a salmon gill net, which he had made before leaving his home at Augusta, Me. In company with James Booker and Percy Woodsom, Mr. Hume began fishing for salmon in the Sacramento River just in front of the city of Sacramento. William Hume had been salmon fishing in the Kennebec River in the State of Maine with his father, where his father and grandfather had been engaged in the same business since 1780, and their ancestors in Scotland had for pleasure pursued the sportive salmon on the Tweed and Tay for centuries before. In 1856 William Hume went back to Maine, and on his return to California the same year was accompanied by his brothers, John and G. W. Hume, who also engaged in salmon fishing in the Sacramento River. Among the schoolmates of G. W. Hume was one Andrew S. Hapgood, who had learned the tinsmith's trade, and who a short time after G. W. Hume left for California went to Boston and entered the employ of J. B. Hamblen, a pioneer in the canning business, and was sent by him to Fox Island on the coast of Maine, to engage in canning lobsters. The canning of lobster was a new and growing industry, and Mr. Hamblen, to increase his business, a short time after sent Mr. Hapgood to the Bay of Chaleur, an arm of the sea which divides the Province of Quebec from that of New Brunswick,

where, in addition to the canning of lobster, they also canned a few salmon. I believe this was the first salmon canned on the American Continent, and I am informed that the business in a small way is still carried on in that section of the country. In 1863 G. W. Hume went back to Maine, and while there visited Mr. Hapgood at Fox Island, to which place he had been again sent by Mr. J. B. Hamblen to take charge of the works at that place. During the visit of Mr. G. W. Hume to his friend Hapgood a talk about salmon was had, and it was agreed that if salmon on the Pacific coast were as plentiful as represented by Mr. Hume much money could be made in a salmon-cannery business. The plan decided on was that Mr. G. W. Hume, on his return to California, should try and induce his brother William to engage in the business with them, and, if he succeeded in so doing, Mr. Hapgood should purchase the necessary machinery and come out to California in time for the spring season of 1864. Mr. William Hume being agreeable to take part in the enterprise, Mr. Hapgood set out on the journey and arrived at San Francisco on March 23, 1864, and a few days later at the location where the operations were afterwards conducted.[a]

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For a considerable time after the salmon-canning business was inaugurated the packers suspended operations in the early part of July of each year, as at that time the market would take only goods which showed a rich oil and the best food values.[b]

The business languished after the firm established its cannery on the Columbia River, but in 1874 was renewed again by others and continued with varying success until 1905, when it ceased, owing to the smaller quantity of fish available and the difficulty of competing with the mild-cure packers and the fresh-fish dealers.

Monterey Bay.—The first harbor south of San Francisco is Monterey Bay, a large indentation cutting into Santa Cruz and Monterey Counties. Only a portion of it is well sheltered, however. For a number of years it had been known that salmon frequented the waters of this bay for the purpose of feeding on the young fishes which swarmed there. Sportsmen frequently caught them with rod and reel, but it was not until the early eighties that the industry was established on a commercial basis. It has since grown very rapidly. The catch has either been mild cured at Monterey or shipped fresh.

ALASKA.

Alaska is the most favored salmon-fishing region. Many rivers, some of great length and draining enormous areas, intersect the district in every direction, while the number of small creeks is countless. Almost every one of these have runs of salmon of varying abundance. The principal streams entering Bering Sea are the Yukon, Kuskokwim, Togiak, Nushagak, Kvichak, Naknek, Ugaguk, and Ugashik; in central Alaska the Chignik, Karluk, Alitak, Sushitna, and Copper

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[a] The description of the machinery used and the methods of canning have been quoted in full under "Canning" elsewhere in this report.

[b] The first salmon cannery. By R. D. Hume. Pacific Fisherman, Seattle, Wash., vol. II, no. 1, January, 1904, p. 19–21.

Rivers are the main streams, while in southeast Alaska are found, among many others, the Anklow, Seetuck, Alsek, Chilkat, Chilkoot, Taku, Stikine, and Unuk Rivers. Most of the fishing in Alaska is carried on in the bays into which these rivers debouch. In southeast Alaska, which is composed largely of islands, the fishing is carried on mainly in the bays, sounds, and straits among these.

Even before the purchase of the District from Russia in 1867 our fishermen occasionally resorted to southeast Alaska and prepared salted salmon. The salmon fisheries did not become important, however, until canning was begun. The first two canneries in the District were built in the spring of 1878, both being located in southeast Alaska. One was built by the Cutting Packing Co. at the Redoubt, Old Sitka, on Baranof Island, while the other was constructed at Klawak, on Prince of Wales Island, by the North Pacific Trading & Packing Co., which latter company still operates at the same place.

The first cannery in central Alaska was built by Smith & Hirsch at Karluk, on Kodiak Island; in western Alaska the first was constructed on Nushagak Bay in 1884 by the Arctic Packing Co.

Owing to the increased demand for canned salmon and the inability of the coast States canneries to keep pace with it, the number of canneries in Alaska rapidly increased for some years until in 1890, when there were 38 in operation. The inevitable happened about this time, however, the production having far outstripped the demand, and canned salmon became a drug on the market.

Heretofore each cannery had operated without regard to the others, but with this condition of affairs prevailing it was soon perceived that steps to reduce the output would have to be taken, and a number of the companies pooled their packs, reduced the number of plants operated, and thus cut down the output nearly one-half. The first arrangement was only temporary, but in 1893 a number of the companies combined permanently and formed the Alaska Packers' Association, which was then, and is yet, the largest company operating in the District.

Since 1893 the industry has experienced periods of alternate prosperity and adversity. In 1910 there were in operation 23 canneries in southeast Alaska, 10 in central Alaska, and 19 in western Alaska, a total of 52. The high prices realized for salmon in 1910 have drawn more capital into the industry, and in 1911 13 new canneries will be constructed and operated.

III. APPARATUS AND METHODS OF THE FISHERY.

GILL NETS.

The gill net is the oldest and most popular form of apparatus in use in the salmon fisheries of the Pacific coast. There are two kinds, drift and set, these names clearly expressing the difference between them. Fine flax or linen twine is generally used in their manufacture, although in some places cotton twine is employed, and it has usually 12 threads and is laid slack. They are hung in the ordinary manner—to a rope with cork floats to support the upper portion of the gear, and to a line with lead sinkers attached, which keeps the net vertical in the water and all its meshes properly distended. The nets are tanned, usually several times each season.

Drift nets vary greatly in length and depth, depending upon the width of the fishing channels, the depth of water, etc. On the Sacramento River they average about 300 fathoms in length, are 45 meshes deep, and have a stretch mesh of from 7½ to 9½ inches. On the coastal rivers of Oregon these nets average about 125 fathoms in length, and are about 36 meshes in depth, the mesh varying with the species of salmon sought. On the Columbia River the nets average about 250 fathoms in length and have a stretch mesh for chinooks of 9 to 9½ inches. On the Willamette River, the principal tributary of the Columbia, they average about 75 fathoms in length, with meshes of 8 and 9½ inches. On Willapa Harbor drift gill nets run from 100 to 250 fathoms in length, are 30 meshes deep, with stretch meshes of 7 and 8½ inches. On Grays Harbor they average 100 fathoms in length, the chinook nets run from 24 to 45 meshes in depth, with a stretch mesh of 9 inches, while the silver or coho nets are 35 meshes in depth, with a stretch mesh of 7 inches. In the Puget Sound region the nets average 300 fathoms in length, with meshes suitable for the particular species sought. In Alaskan waters the nets vary greatly in length and depth, depending upon the places where fished.

Drift gill netting is prosecuted chiefly in the estuaries of the rivers in and near the channels. If the water is clear the nets are set only at night, but should the water be muddy or discolored with glacial silt, fishing can be carried on either night or day. Night fishing is most common in the States, while day fishing is most common

in Alaska. When fishing in rivers it is necessary to work in a straight stretch of water of fairly uniform depth and free from snags or sharp ledges, these being called "reaches."

In setting the net the boat puller rows slowly across the stream while the other man pays out the apparatus, to the first end of which a buoy has been attached. When about two-thirds of the gear is out the boat is turned downstream at nearly right angles to her former course, so that the net, when set, approximates the shape of the letter L. The net is laid out at nearly right angles or diagonally to the river's course, so that it will intercept the salmon that are running in, and is usually put out about an hour before high water slack and taken in about an hour after the turn of the tide. In Alaska the fishermen usually fish on both the high and low slack. The nets are allowed to drift for the time specified, the fishermen drifting along at one end, then the net is hauled into the boat over a wooden roller fixed in the stern, and the fish, which have become gilled in the meshes, are removed and thrown into the bottom of the boat.

Set gill nets are made in the same way as drift nets, in many instances being fragments of the latter, and are usually operated in the upper reaches of the rivers. They vary in length from 10 to 100 fathoms, from 35 to 65 meshes in depth, and have the same sizes of meshes as the drift nets, the size varying, of course, with the species sought for. Sometimes these nets are staked, sometimes anchored, while occasionally only one end is tied to the shore or a stake set in the water.

On the flats off the mouth of the Stikine River, in southeast Alaska, a combination of the drift and set method is followed. A double set of stakes, about 6 feet apart, are set out from the shore for a distance of several hundred yards. An hour or two before slack water the fishermen pay out the net parallel to the line of stakes and about 50 feet from them. The tide drifts the net down until it is caught against the stakes, which retain it until slack water, when the fisherman takes it up and repeats from the opposite direction on the next turn of the tide.

HAUL SEINES.

On the Columbia River, where this form of apparatus plays a prominent part in the fisheries, the nets vary in length from 100 to 400 fathoms; the shallowest end is from 35 to 40 meshes deep, but it rapidly increases in width and is from 120 to 140 meshes deep at the other wing. The "bunt," or bag, in the central part of the net is about 50 fathoms long. These nets are usually hauled on the numerous sand bars which are a very noticeable feature of the river at low tide. Buildings are erected on piles on these sand flats, in which the

men and horses take refuge at high tide, when the bars are covered with water. Operations begin as soon as the beach or bar uncovers, so that the men can wade about. The net is placed in a large seine boat, with the shore end attached to a dory. At the signal the seine boat is headed offshore, while the dory heads toward the bar. As the seine boat circles around against the current the net is paid out in the shape of a semicircle. The dory men hurry to the bar with the shore end of the net, the idea being to get that in as soon as possible in order to prevent the escape of the salmon in that direction. As soon as this has been accomplished, the outer shore line is brought to the bar, when several horses are hitched to the line and begin to haul in the net, care being taken by the men to work it against the current as much as practicable, and to get it in as speedily as they can in order to prevent the escape of salmon either by jumping over the cork line or finding some outlet below the footrope or lead line.

The only other place on the coast where haul seines are important is at Karluk, on Kadiak Island, in Alaska. Here the seines are hauled upon the narrow sand pit dividing the lagoon from the strait, and practically the same method is followed as in the Columbia River.

DIVER NETS.

These are in use in the Columbia River, mainly throughout the middle and upper portions of the river. They vary from 100 to 200 fathoms in length and are used almost exclusively for chinook salmon. In construction they somewhat resemble a trammel net. Two nets are attached together side by side. The outer one, or the one toward the oncoming fish, has a larger mesh than the other, so that if the fish manages to pass through the first, it will be caught in the smaller meshes of the second.

DIP NETS.

These consist of an iron hoop secured to the end of a stout pole with a bag-shaped net fastened to the hoop. They are generally used at the cascades on the rivers, small platforms being erected upon which the operator stands while fishing. Indians formerly used them to a large extent, but, owing to the steady decline in the number of Indians, and the appropriation of favorable spots by the whites for other forms of apparatus, they are but little used now.

SQUAW NETS.

This type is virtually a set net. It consists of an oblong sheet of gill netting, about 12 feet long and 8 feet deep, its lower edge weighted to keep it down, and its upper edge attached to a pole that floats at the surface, and is held by a line or lines to another projecting pole which is securely fastened to the shore, so that it will not

swing around with the strain of the swift current on the net. A single block is attached to the pole, and through this passes a rope, thus making a tackle for the more convenient manipulation of the net. The dip-net fishermen of the Columbia River use this net, which derives its name from the fact that it used to be commonly operated by Indian squaws for taking salmon. But few are now in use, for the same reasons as given for the decline in the use of dip nets.

PURSE SEINES.

This form of apparatus is in quite general use in Puget Sound and southeast Alaska, and has proved highly effective in these deep, swift waters. These seines are about 200 fathoms long, 25 fathoms in the bunt, and 20 fathoms in the wings, all with a 3-inch mesh. The foot line is heavily leaded and the bridles are about 10 feet long. The purse line is made of 1½-inch hemp. The rings through which the purse line is rove measure about 5 inches in diameter and are made of galvanized iron.

On Puget Sound the purse seiners congregate mainly on what are known as the Salmon Banks, off the lower end of San Juan Island, during the run of sockeyes. After this run is over they go up the Sound and fish for dogs and cohos, and later go to the head of the Sound and fish for dogs, cohos, chinooks, and steelhead trout. In southeast Alaska they follow the fish all over the bays, straits, and sounds of that section. Purse seines are used in a few other places, but the fishery is secondary to those with other forms of apparatus.

On Puget Sound special power boats, which are fitted with a power winch for hauling in the net, are used almost exclusively in operating the purse seines. As soon as a school of fish is sighted one end of the seine is attached to a dory, and while this remains stationary the seine boat starts off, the crew paying out the net over a roller in the stern. A circle is made around the fish, the boat returning to the dory. The purse line is then attached to the winch, and the line slowly hauled in by power. As the net comes in, the slack is neatly coiled up on a platform in the stern of the boat, the cork line lying on one side and the lead line on the other. As the circle gradually narrows a man stands at the davit with a long pole which he continually plunges into the circle and between the purse lines for the purpose of frightening the fish away from the center of the net, which is open for about a third of the time required to purse it. The poleman in time becomes very expert and is able to plunge the pole into almost any part of the center and have it return unaided to his hands. After the net has been pursed, the bag is either rolled into the boat or the fish dipped or gaffed from the net into the boat.

This style of fishing is said to have been introduced on Puget Sound by the Chinese in 1886.

TRAPS OR POUND NETS.

A trap is stationary and consists of webbing, or part webbing and part wire netting, held in place and position by driven piles. This piling usually is held together above water by a continuous line of wood stringers, also used to fasten webbing to or to walk on if necessary.

In building, the "lead" is first constructed. This runs at right angles, or very nearly so, to the shore, and consists of a straight line of stakes, to which wire or net webbing is hung from top of high water, or a little higher, to the bottom, making a straight, solid wall.

At a little distance inshore of the outer end of the lead begin what are called the "hearts." These are V-shaped and turned toward the lead, beginning at a distance of 30 to 40 feet on either side of same and running in the same general direction, the "big heart" or outer heart first, the inner heart, supplementing the first, being smaller, and the end of the outer heart leading into it. The narrow end of the inner heart leads into the "pot" and forms what is known as the "tunnel." The tunnel ends in a long and narrow opening, running up and down the long way, and is held in position by ropes and rods. Below this is what is known as the "apron," a sheet of web stretched from the bottom of the heart upward to the "pot," in order to lead the fish into the tunnel when swimming low in the water, and to obviate the necessity of building the pot clear to the bottom, which would be expensive, as the pots of the traps are usually in quite deep water.

Some traps have "jiggers" (a hook-shaped extension of the outer heart) on each side, which help to turn the fish in the required direction.

The "pot" is placed at right angles with the inner heart and immediately adjoining same. It is a square compartment, with web walls and bottom connected in the shape of a large square sack, fastened to piling on all sides. This pot is hauled up and down by means of ropes and tackles, either by hand or, as is most popular, by steam.

The "spiller" is another square compartment adjoining either end of the pot (sometimes there are two "spillers," one at each end), and is simply a container for fish. A small tunnel leads the fish from the pot into the spiller, from whence the fishermen lift them out. This is accomplished by closing the tunnel from the pot, after which the ropes holding the front of the spiller are loosened and the net wall allowed to drop almost to the level of the water. A steam tug then pushes a scow alongside the spiller and takes position on the outside of this scow. From the deck of the tug a derrick is rigged with a running line from the steam capstan through the block at the top of the derrick. This line is attached

to the far end of a net apron, called a "brailer," which is heavily weighted by having chains along each side and leaded crossways at several places. A small boat is run inside the spiller, and the men in this draw the brailer across the barge and let it sink in the spiller. The fish soon gather over it, when the steam capstan quickly reels it in, the net folding over as drawn in from its far side and spilling the fish out on the scow. Men on the scow pick out and throw overboard the undesirable fish. The apron is then drawn back across the pot and the operation repeated so long as any fish remain. In this manner a trap with many tons of salmon in it is quickly emptied.

Traps, like nearly all other fixed fishing appliances, are built on the theory that salmon, like most other fishes, have a tendency to follow a given course in the water, whether a natural shore line or an artificial obstruction resembling one; also that the fish very seldom turns in its own wake. The trap has taken advantage of these natural tendencies of the fish, and is arranged so that, although the salmon may turn, he will continually be led by the wall of net toward and into the trap.

If a trap is located in a place where fish play and where an eddy exists, and the fish run one way with the incoming tide and the opposite with the outgoing, it will fish from both directions; if located where the fish simply pass by, as, for instance, on a point or reef, it will fish from one side only.

A variation of the trap, to be used in places where piles can not be driven, is the floating trap. An experimental trap of this variety was used at Uganuk, on Kodiak Island, Alaska, as early as 1896. Its use was abandoned in 1897, not to be resumed until some years later. A number of floating traps (of the type invented by Mr. J. R. Heckman, of Ketchikan, Alaska) have been and are being used in southeast Alaska, the first having been installed in 1907. The design of this trap follows the shape of an ordinary Puget Sound driven trap. It is constructed of logs, 20 to 26 inches at the butt, bolted and braced together in one solid frame. Suspended from this frame through the logs are $2\frac{1}{2}$-inch pipes extending down in the water 30 feet. Halfway down these pipes and also on the extreme lower ends are eyebolts, to which the web is drawn down and fastened. Thus the web is kept in place as well as if the pipes were driven piles. The lead is also a continuation of large piles or logs bolted firmly together with similarly suspended pipes and webbing.

The so-called wooden traps on the Columbia River are essentially weirs, being a modification of the brush weirs or traps used by the Indians for the capture of salmon long before the advent of the white men. They are built on shore, of piling and planks, the latter arranged like slats with spaces between. The bowl, or pot, is

provided with a movable trapdoor that can be opened during the closed season and on Sundays, so that the fish can pass through and run upstream. These weirs, after being built, are launched into the river, placed in proper position near the shore, and then ballasted so that they sink to the bottom.

According to Collins,[a] "pound nets were introduced on the Columbia River in 1879. In May of that year Mr. O. P. Graham, formerly of Green Bay, Wis., built a pound net on the river similar to those used on the Great Lakes. The success of this venture led to the employment of more apparatus of this kind, and many fishermen went West to participate in the fishery."

According to the same authority[b] Mr. H. B. Kirby, who had previously fished on the Great Lakes, set a pound net in Puget Sound about 1883, but it was a complete failure. On March 15, 1888, he again set a pound net, which he had designed to meet the new conditions, at Birch Bay Head, in the Gulf of Georgia. It proved a complete success, and was the forerunner of the present large number which are set annually in these waters.

In Alaska the first trap was set in Cook Inlet about 1885. British Columbia refused to permit the use of pound nets in its waters until 1904, when their use was allowed within certain limited regions.

Some of these trap nets, especially on Puget Sound, have proved extremely valuable. The years 1898 and 1899 covered practically the high-water mark, as several desirable locations changed hands in those years at prices ranging from $20,000 to $90,000 for single pounds, the original expense of which did not exceed $5,000. But few have brought such high prices since, however, owing to the decline in the run of salmon.

The location of sites for these nets is regulated by law in Oregon, Washington, and British Columbia, but in Alaska the procedure is not well defined and has proved rather confusing to strangers. Some acquire the necessary shore line by mineral location or by the use of scrip, while still others have merely a squatter's right. Within the bounds of the forest reserve no land can be acquired except by lease, which may be secured from the United States forestry agent, Ketchikan, Alaska.

INDIAN TRAPS.

The natives, especially in Alaska, have various ingenious methods of catching salmon. In the Bering Sea rivers they catch them by means of wickerwork traps, made somewhat after the general style of a fyke net. These are composed of a series of cylindrical and conical baskets, fitting into each other, with a small opening in the

[a] Report on the fisheries of the Pacific Coast of the United States, by J. W. Collins, Report of Commissioner of Fish and Fisheries for 1888, p. 210. 1891.

[b] Ibid., p. 257.

end connecting one with the other and the series terminating in a tube with a removable bottom, through which the captive fish are extracted. Some of the baskets are from 15 to 25 feet in length and are secured with stakes driven into the river bottom, while the leader, composed of square sections of wickerwork, is held in place by stakes.

During the summer of 1910 the author found and destroyed an ingenious native trap set in Tamgas stream, Annette Island, southeast Alaska. This stream is a short and narrow one, draining a lake, about midway of which are a succession of cascades. In the narrowest part of the latter, and in the part up which the fish swim, a rack had been constructed of poles driven into the bottom and covered with wire netting, so as almost wholly to prevent salmon from passing up. Just below, and running parallel to the rack and at right angles to the shore, was placed a box flume with a flaring mouth at the outer end. At the shore end the flume turned sharply at right angles and discharged into a square box with slat bottom and covered over with boughs. The fish in ascending the stream would be stopped by the rack and in swimming around many of them would be carried by the current into and down the flume, eventually landing in the receiving box alongside the shore.

WHEELS.

Fish wheels are of two kinds, the floating or scow wheel, which can be moved from point to point if need be, and the shore wheel, which is a fixed apparatus. They operate in exactly the same manner, however. The stationary wheel is located along the shore in a place where experience has shown that the salmon pass. Here an abutment is built of wood and stone, high enough to protect it from an ordinary rise in the river. To this is attached the necessary framework for holding the wheel. The latter is composed of three large scoop-shaped dip nets made of galvanized-iron wire netting with a mesh of $3\frac{1}{2}$ to 4 inches. These nets are the buckets of the wheel, and they are so arranged on a horizontal axis that the wheel is kept in constant motion by the current, and thus picks up any fish which come within its sweep. The nets are fixed at such an angle that as they revolve their contents fall into a box chute through which the fish slide into a large bin on the shore. The wheels range in size from 9 to 32 feet in diameter and from 5 to 15 feet in width, and cost from $1,500 to $8,000, the average being about $4,000. A number of them have long leaders of piling running out into the river, which aid in leading the salmon into the range of the wheel.

The scow wheel consists of a large square-ended scow that is usually decked at one end and open at the other. Several stanchions, some 8 to 10 feet high, support a framework upon which an awning

is spread to protect the fish from the sun's rays and the crew from the elements. To one end of the scow are fastened two upright posts, which are guyed by wooden supports, while projecting from the same end is the framework which supports the wheel, the latter being constructed in the same way, but on a smaller scale, than the stationary wheel. In operation the scow is anchored with the wheel end pointing downstream, and as the wheel is revolved by the current the fish caught fall from the net into a box-chute, through which they slide into the scow. As stationary wheels can be used only at certain stages of water, the scow wheel is a necessary substitute to be used at such times as the former can not be operated.

The above forms of wheels are used exclusively on the Columbia River.

An ingenious device is used by some of the wheelmen on the Columbia River in getting their catch to the canneries, a few miles farther down the river. The salmon are tied together in bunches and these attached to air-tight casks and sent down the stream. At the canneries small balconies have been constructed at the water end of the building. A man armed with a pair of field glasses is stationed here, and as soon as he sights one of these casks he notifies a boatman, who goes out and tows in the cask and salmon. About 800 pounds of salmon are attached to a keg, and a tag showing the wheel from which shipped is tied to the fish.

In 1908 the first fish wheel to be located in the coastal waters of Alaska was operated in the Taku River, in southeast Alaska. The wheel was set between two 4-foot scows, stationed parallel to each other, and each 40 feet in length. The wheel had two dips, each 22 feet in width and hung with netting. It could be moved from place to place, the same as the scow wheels on the Columbia River. It was operated throughout the king and red salmon runs, but caught almost no salmon, and was not set in the succeeding years.

For many years the natives of the interior of Alaska have been resorting to the banks of the Yukon River and its tributaries in order to secure a sufficient supply of salmon to sustain them through the succeeding winter. The favorite apparatus of these natives is a type of fish wheel of local invention, which has been in use by them for many years, probably long before the white man first saw the Yukon. A square framework of timbers is constructed in the water and moored to the bank by ropes. A wheel, composed of three dips, is placed in this, the axle resting upon the framework. The shape of the dip is such that the salmon caught roll off it into a trough, down which they slide into a boat moored between the wheel and the shore. Although crude in construction, it is very effective and a large number of them are set each season.

The Columbia River fish wheel is a patented device. It was first used by the patentees, Messrs. S. W. Williams & Brother, in 1879, and for several years they retained a monopoly in its use. A number are now operating on the river. The device was not new even when patented, as the natives of the Yukon River Basin had been using a precisely similar principle for an unknown number of years previously, while a similar "fishing machine," as it is called, had been in use prior to this time and is still used by white fishermen on the Roanoke River, in North Carolina.

REEF NETS.

As the name indicates, this device is used around the reefs. Under natural conditions the reef is covered with kelp throughout its length, the kelp floating at the top of the water. A channel is cut through this, and in it is placed a tunnel of rope and netting, which flares at the outer end, in deep water, and into which is thatched grass, kelp leaves, or any other article resembling submarine growth, to hide the construction sufficiently to avoid frightening the fish. Short leads of kelp are also arranged on the sides so as to draw the fish to the tunnel, which is held in place by anchors. On the reef itself two boats are anchored parallel to each other and some feet apart. An apron of netting is fastened to the rear of the two boats, while the other end extends under the small end of the tunnel and is kept in place by men in the forward ends of the boats, who have lines fastened so the apron can be raised by them. The device can only be used with the tide entering the tunnel at the large end. When the fish have entered and passed through the tunnel upon the apron, the men raise the floating end of the latter and dump them into the boats.

At one time this was a favorite device of the Puget Sound natives for catching sockeye salmon. They attribute its origin to one of the Hudson Bay Company's employees, who, they say, taught them a long time ago how to catch salmon in this way. Owing to the large number of men required to work them, and the fact that they can be worked only at certain stages of tide and in favorable weather, these nets have gradually been supplanted by other devices. In 1909 but five were used and these were operated off the shores of San Juan, Henry, Steuart, and Lummi Islands, and in the vicinity of Point Roberts.

TROLLING.

Each year the catching of salmon by trolling becomes of increasing importance commercially. For some years sportsmen had this exciting and delightful occupation to themselves, but eventually the mild curers created such a persistent and profitable demand for king, or chinook, salmon that the fishermen, who had previously restricted

their operations to the use of nets during the annual spawning runs, which last but a small portion of the year, began to follow up the fish both before and after the spawning run and soon discovered that they were to be found in certain regions throughout nearly every month in the year.

The Monterey Bay, Cal., trollers use 48 cotton line generally. A few inches below the main lead an additional line is added, with a small sinker on it. This gives two lines and hooks, and as the main line has but the one lead, and that above the junction with the branch line, it floats somewhat above the latter, which is weighted down with a sinker. The main stem is about 20 fathoms in length, while the branch lines are about 5 fathoms each. These lines cost about $3.50 each. No spoon is used, but bait almost invariably. A few fishermen use a spread of stout steel wire, 4 feet long, with 5 or 6 feet of line on each end of the spread, two lines and hooks.

On the upper Sacramento River (mainly at Redding and Keswick) some fishing is done with hand lines. A small catch was made here in 1908, but none were so caught in 1909.

Even as early as 1895 trolling was carried on in the Siuslaw River, Oreg., for chinook and silver salmon. At Oregon City and other places on the Willamette River a number of chinook salmon are caught by means of trolling each year, mainly by sportsmen. A spoon is quite generally employed in place of bait. The fishermen claim that the salmon are not feeding at this time, as their stomachs are shriveled up.

For a number of years the Indians living at the reservation on Neah Bay, Wash., have annually caught large numbers of silver and chinook salmon in the Strait of Juan de Fuca. A few white fishermen also engage in this fishery at the present time in the same waters, while others troll for the same species, but more particularly silvers, in parts of Puget Sound proper. The ordinary trolling line, with a spoon instead of bait, is used.

The most remarkable trolling region is in southeast Alaska. For some years the Indians here had been catching king salmon for their own use during the spring months, and about the middle of January, 1905, king salmon were noticed in large numbers in the vicinity of Ketchikan. Observing the Indians catching these, several white fishermen decided to engage in the pursuit, shipping the product fresh to Puget Sound ports. They met with such success that 271,644 pounds, valued at $15,600, were shipped. The next year several of the mild-cure dealers established plants in this region, thus furnishing a convenient and profitable market for the catch, and as a result the fishery has grown until, in 1910, 204,823 king salmon and 6,000 coho salmon were caught and marketed. The length of the fishing season has also lengthened until now the business is prosecuted vigorously during about seven months in the year,

and in a desultory manner for two or three months more, only the severe winter weather preventing operations the rest of the year.

In southeast Alaska the fishermen generally use either the Hendryx Seattle trout-bait spoon no. 5 or the Hendryx Puget Sound no. 8. The former comes in nickel or brass or nickel and brass, the full nickel preferred. The Siwash hook no. 9/0, known as the Victoria hook in British Columbia, is in quite general use. As a rule, but one hook is used, and this hangs from a ring attached to a swivel just above the spoon, while the point of the hook comes a little below the bottom of the spoon. Occasionally double or treble hooks are used. Some fishermen use bait, and when this is done the herring, the bait almost universally employed, is so hooked through the body as, when placed in the water, to stretch out almost straight and face forward as in life.

A small commercial fishery is carried on in this region for coho salmon, mainly in August and September, in the neighborhood of Turnabout Island, in Frederick Sound. A Stewart spoon with two hooks on one ring is used, baited with herring in such a way that the fish is straightened out and faced toward the spoon. The sportsmen of Ketchikan also fish with rod and reel for this species in the neighborhood of Gravina Island, using a Hendryx spoon (kidney bait no. 6), which is silvery in color on one side and red on the other. Although much smaller than the king, the coho salmon is more gamy.

Reports from the trollers of southeast Alaska prove that all species of salmon will take the hook at some time or other in the salt waters of this region, an examination of their stomachs generally showing that they are either feeding or in a condition to feed.

BOW AND ARROW.

On the Tanana River, a tributary of the Yukon River, in Alaska, the Indians hunt salmon in birch-bark canoes with bow and arrow. As the canoe is paddled along and the Indian sees the dorsal fin of the salmon cutting the surface of the muddy water he shoots it. The tip of the arrow fits into a socket, and when struck the tip, which when loose is attached to the stock by a long string, comes out of the socket and the arrow floats, easily locating the fish for the fisherman.

SPEAR AND GAFF.

Spears of varying shapes and styles have been in use by the Indians from time immemorial and are still employed on many rivers in which salmon run. With the exception of the Chilkoot and Chilkat Rivers of Alaska, practically all of the catch secured in this manner is consumed by the fishermen and their families. In the Chilkoot River the Indians have built numerous racks in the stream and on the banks, upon which they stand and hook the fish out with a gaff attached to a pole. The catch is sold to the cannery located on Chilkoot Inlet.

IV. FISHERMEN AND OTHER EMPLOYEES.

In the early days canning was a haphazard business, and workmen came and went as common laborers do in the wheat fields of the West. As the business increased in importance and the need of skilled labor became imperative, men were put to certain work and kept at it from season to season, with the result that in a few years a corps of highly skilled laborers had been evolved, and this had much to do with the rapid extension of the industry.

For many years Chinese formed the greater part of the cannery employees, the superintendent, foreman, clerks, machinists, and the watchmen alone being whites. No other laborers have ever been found to do the work as well or with as little trouble as the Chinese. In times of heavy runs, when the cannery would have to operate almost night and day in order to take advantage of what might be the last run for the season of the sometimes erratic salmon, the Chinese were always willing, even eager, to do their utmost to fill the cans, and if fed with the peculiar food they insisted upon having and due regard was had to certain racial susceptibilities, the cannery man could almost invariably depend upon the Chinese doing their full duty.

The Chinese-exclusion law cut off the supply of Chinese, and as the years went by and their ranks became decimated by death, disease, and the return of many to China, the contractors were compelled to fill up the rapidly depleting crews with Japanese, Filipinos, Mexicans, Porto Ricans, etc., with the result that to-day in many canneries special quarters have to be provided for certain of the races—more particularly the Chinese and Japanese—in order to prevent racial hatred from engendering brawls and disturbances.

The Japanese now compose about one-half of the cannery employees. While a few cannery men express themselves as well pleased with this class of labor, the majority find it troublesome.

In Alaska and at a few places in the States Indians are employed in the canneries. In Alaska more would be employed if they could be secured. They make fair workpeople, but are rather unreliable about remaining through the season.

The supplying of this kind of labor is done largely through the contract system. In the large cities along the coast are labor agencies, mainly owned by Chinese, which make a specialty of furnishing labor for this work. In the agreement between the canning

company and the contractor the company guarantees to pack a certain number of cases during the coming season and the latter agrees to do all the work from the time the fish are delivered on the wharf until they are ready to ship at the end of the season, for a certain fixed sum per case. Should the cannery pack more than the guaranteed number, which it usually does if possible, the excess has to be paid for at the rate per case already agreed upon, while if the pack for any reason should fall below the contract amount the company must pay for the shortage the same as though they had been packed. The company transports the Chinese to the field of work and carries them to the home port at the end of the season. It provides them with a bunk house, and furnishes fuel, water, and salt. The contractor sends along with each crew a "boss," who has charge of the crew, and furnishes their food, the company transporting this free.

White men do the greater part of the fishing for salmon, many nationalities being represented, but Scandinavians and Italians predominating almost everywhere. A number of Greeks are to be found fishing in the Sacramento, while Slavonians do most of the purse-seining on Puget Sound. The native-born American is not often found actually engaged in fishing, but frequently is the owner of the gear or has a responsible position in the packing plants.

A number of Indians participate in the fisheries of Alaska, and a few fish in Washington. The only Chinese engaged in fishing are in Monterey Bay. A number of Japanese also fish in this bay, which is the only place in American territory where they fish for salmon, except in Alaska, where the small number of 13 were occupied in 1909. A number of Japanese engage in fishing in Canadian waters.

In many places on the coast, particularly in Alaska, fishing is a hazardous occupation. In Alaska most of it is done in the bays, sounds, and straits, where storms are frequent, and the annual loss of life is heavy. The records of the Alaska Fishermen's Union show for its members the following losses of life by drowning: 1905, 10 men; 1906, 5 men; 1907, 10 men; 1908, 17 men; and 1909, 17 men.

The fishermen early saw the advantages of organization, and nearly every river now has a union, which is subordinate to the general organization. One of the most typical of these is the Alaska Fishermen's Union, which has active jurisdiction over all sections of Alaska, except a portion of southeast Alaska. Early in the year this organization enters into contracts with the salmon canneries and salteries, by which the rates of wages, duties, etc., of the fishermen are fixed in advance. As a result of this mutual agreement upon terms, but little trouble is experienced with the fishermen, who generally conform scrupulously to the terms of the contract, and strikes and bickerings, which were very common a few years ago, are now almost entirely absent.

V. FISHERY REGULATIONS.

CONTROVERSIAL FORMS OF APPARATUS.

From time immemorial the users of certain forms of fishing apparatus have complained of and condemned the use of other forms, which, either through disinclination, through lack of financial means, or because it was not suitable for use in the section in which they fished, they themselves have not seen fit to employ. In some instances these complaints are well founded, but an unprejudiced observer is apt to view with suspicion charges advanced under conditions when personal interest may so easily cloud or color the individual judgment. In a court of equity it is a well-established principle that the plaintiff must appear with clean hands, and that is a difficult matter for the users of any form of apparatus in the salmon fisheries of the Pacific coast. If in one section the fishermen live strictly within the letter and spirit of the law, the users of the same apparatus in another section may be the most persistent and destructive violators. And, again, while the law may be strictly observed, the law itself may be inadequate or purposely deficient, and the apparatus therefore be doing incalculable damage to the fisheries.

While all forms of apparatus in use in the salmon fisheries of the Pacific coast have been objected to in some one section or another, the principal complaints have been against fish wheels and trap or pound nets. The wheels are used only in the Columbia River. The traps are found in the Columbia River and in the other waters of the State of Washington and in Alaska.

To the objections of other fishermen the owners of wheels and traps retaliate by charging prejudice and self-interest, and with some justification. It is unquestioned that these costly forms of apparatus are beyond the financial means of the ordinary fishermen, that their use reduces the number of persons employed in the fisheries, and that the owners, who are usually the packers or others closely affiliated with them, can, if they so desire, render themselves largely independent of other fishermen, such as the gill netters and seiners, and thus keep down the cost of the fish to the packers. Although not often advanced publicly, this is the real basis of the most of the complaints. Publicly the objections are based upon higher grounds,

such as the waste through catching and killing in wheels and traps of enormous quantities of salmon which can not be handled in the limited time available, or of species which the packers have no use for, and which they find it easier or less expensive to kill by much handling than to release and in so doing lose a few salmon.

One thing should never be lost sight of, however. Fishery apparatus is set for the purpose of catching fish, and its value is dependent upon the degree of effectiveness with which it accomplishes the object sought with the least expenditure of money and time for construction and operation.

It is a question whether, under present conditions, if the use of traps were abolished, the other forms of apparatus would be able to keep pace with the demand for fish. But the question of whether traps should be allowed or not in any one section should be settled by reference solely to the conditions prevailing in that section, and not to theoretical or general objections to traps as traps or to objections based upon trap fishing in some other and, possibly, vastly different section. There are some regions on the Pacific coast where if traps were permitted they would soon destroy the run of salmon, while there are many other sections where they would not injure the fisheries at all, unless possibly by use in too great numbers. The latter is especially true in many parts of Alaska, where the chief objection is that in a few places too many of them are grouped together.

A considerable part of the objection to the use of traps is doubtless due to the generally shameless disregard of the laws in the past, and in some sections also to-day. In Alaska up to 1908 the trap owners paid practically no attention to the laws, and the same is true to a large extent to-day on Puget Sound, and to a lesser extent, possibly, in the Columbia River. Since the enactment and rigid enforcement of the excellent trap law of 1906 in Alaska, the objections to trap nets have decreased very noticeably, though the traps have probably caught more fish than they did under the old conditions, the only difference being that the catch has been distributed more equally, and not, as in former times, caught chiefly in those traps situated nearest to the ocean, while those in the upper reaches took but few.

The Washington law prescribes minutely the method to be followed in closing traps during the weekly closed season and appears on its face to be an excellent plan. In practice it is quite otherwise, however, for one person can close or open the trap in one or two minutes' time, and all the watchman has to do in the weekly closed season is to let the apron down whenever he sees a boat approaching, raising it again as soon as he is sure the visitor is not a fish warden. Thus it is practically impossible to detect any but the boldest or most careless violations of the law.

The provision in the Alaska fisheries law regulating the manner of closing traps during the weekly closed season is without question the best in the country, and Washington could adopt it with much profit. It requires that "the gate, mouth, or tunnel of all stationary or floating traps shall be closed, and 25 feet of the webbing or net of the 'heart' of such traps on each side next to the 'pot' shall be lifted or lowered in such manner as to permit the free passage of salmon and other fishes." With two men stationed on the trap at least 15 or 20 minutes of most strenuous work is required to open or close the trap in this manner, and the fishery agent has ample time to reach the scene before the operation is completed. This fact has been found to be an excellent deterrent.

At first the owners advanced the plea that the lowering of 25 feet of the web of the heart next to the pot would so weaken the trap that it might be carried away by the very strong and high tides which prevail in Alaska, but three years' actual trial has proved this fear to be groundless, and now no objections are heard to this feature of the law.

Although not used to as great an extent, wheels have probably occasioned more controversy than traps. While the traps are usually set in either bays, straits, and sounds, where the water is salt or brackish, or in the lower reaches of all the rivers, the wheels are set in the upper courses of the Columbia River only. After the fish have run the gauntlet of the almost countless gill nets, seines, and trap nets in the lower and middle river, and are approaching their spawning beds, they meet with the runways leading to the wheels, which in some instances are set in natural channels in the cascades or falls, or in artificial channels through which the greater part of the run must of necessity pass. Nearly all of the salmon hatcheries on the Columbia are located either on the main river below Cascade Locks, or on one of the tributaries entering the river below there, while above this point there were operated in 1909 17 stationary wheels and 5 scow wheels.

It may be maintained that a salmon which has successfully evaded the nets in the section of the river below Cascade Locks is of vastly more importance to the preservation and perpetuation of the fisheries than a number which have not yet crossed the bar at the mouth of the river. Thus, it has been argued, while wheels have not done anything like the damage to the fisheries ascribed to them, a regard for the perpetuation of the fisheries of the Columbia River demands that their use, as well as that of all other forms of apparatus for the taking of fish commercially, should be prohibited above Cascade Locks.

This brings up the question of the justice of such an arrangement from the standpoint of the owners of the wheels. When they put

in these wheels their use was lawful, and the same is true to-day. They are expensive apparatus, and many thousands of dollars are invested in them. In addition there is an important salmon cannery located at Seuferts, just above The Dalles, which would be absolutely worthless if the above action were taken. It would be no more than just, if the States of Oregon and Washington decided to abolish all commercial fishing above Cascade Locks, that a fair valuation for losses be fixed by arbitration and paid to those affected.

There is also no question but what too many gill nets and trap nets are now being fished in the lower part of the river, and some scheme ought to be devised by which the number of licenses annually granted can be reduced very materially.

Strict regulations of the forms of apparatus used in the salmon fisheries and the curtailment of certain or all forms when they become too numerous will be of greater efficacy in the perpetuation of the industry than any other method which has been so far recommended or tried except that of closed seasons.

LAWS AND THEIR ENFORCEMENT.

The history of the enactment and enforcement of laws relating to the salmon fisheries of the Pacific coast (except possibly California) is not one that those earnestly and sincerely desirous of preserving and perpetuating the fisheries have reason to be proud of. In the first place, it has been and is yet exceedingly difficult to secure efficient laws, owing to the influence of the selfish interests which have no regard to the future. In the second place, it was and is yet difficult to secure the enforcement of even the laws that are on the statute books. In most States a change in the governorship almost invariably entails a change in fish commissioner, who is often more concerned with pleasing the interests that secured his appointment and retain him in office than in giving the affairs of his department the attention that they require. This condition, not peculiar to the Pacific Coast States alone, doubtless will eventually be removed to a great extent by divorcing the fisheries departments from politics. The Pacific Coast States have had in the past and still have some earnest men who have been and are doing good work, and this number can easily be increased by making the positions permanent. Under present conditions a fish commissioner scarcely has a comprehensive grasp of the intricate problems of his department and begins to be of value to the State before a change of administration occurs and he is compelled to give way to another man, who in turn must be taught all that his predecessor had learned.

The worst condition of affairs in regard to the making and enforcement of fishery laws is found to prevail in those waters which form the boundary between States or between Canada and the United States.

The Columbia River, which forms the boundary between Oregon and Washington, affords a typical example of the evils which can result from a division of responsibility between two States. For many years each State enacted laws regulating the fisheries of the river with very slight regard usually to laws already in force in the other State. As a result of this the fishermen transferred their residence for license purposes from State to State as the laws of one or the other best suited their particular purposes.

The fishermen and packers also were in apparently irreconcilable conflict as to the proper means to be taken to conserve the fisheries, and each session of the legislatures saw strong lobbies present to work for certain selfish ends, while the few earnest men who had the real welfare of the fisheries of the river at heart had difficulty in making the slightest headway against the influence of these lobbies.

To further complicate the matter, in 1894 Oregon claimed that under the provisions of the enabling act admitting it as a State it had jurisdiction to the Washington shore, and proceeded to arrest Washington men who were fishing in what was the open season according to Washington law but the closed season under Oregon law.

In June, 1908, the voters of the State of Oregon had presented for their consideration two bills radically affecting the waters of Columbia River. One closed the river, east of the mouth of the Sandy River, against all fishing of any kind except with hook and line, and was originated by gill-net fishermen of the lower river for the purpose of eliminating fish wheels in the upper waters. This bill was the first presented to the people, and when it appeared the upriver men retaliated by presenting a bill affecting the lower river to such an extent that it practically prohibited the net fishermen from operating.

Very much to the surprise of all concerned both bills were passed and became laws on July 1, to take effect, as provided, on August 25 and September 10, respectively. The Oregon master fish warden proceeded to enforce both laws, arresting all violators on both sides of the river, irrespective of whether or not they were operating under a Washington or Oregon license, and incidentally did the fisheries a great service by bringing prominently before the public the anomalous condition of affairs which were occasioned by the archaic system under which the fisheries of the Columbia were governed. The State of Washington appealed to the United States courts, which, after argument, issued an injunction preventing the warden from enforcing the laws so far as the Washington fishermen were concerned.

In the meantime the attention of the general Government had been drawn to the apparently irreconcilable conflict between the two States, and fearing that in the mêlée the interests of the fisheries would be lost sight of, President Roosevelt, in a message to Congress, after reciting briefly the lack of harmony in jurisdiction by the

States, recommended that the general Government take over the control of the fisheries of the Columbia, as well as other interstate rivers.

This had the effect of bringing matters to a head and negotiations were soon in progress looking to the preparation of a treaty between the two States by which uniform laws would be adopted, and thus each State have concurrent jurisdiction to the opposite shore of the river. The legislatures each appointed a committee of eight members to confer and frame joint legislation. The two committees met in Seattle, Wash., early in 1909, and agreed upon the following recommendations:

First. A spring closed season from March 1 to May 1.

Second. A fall closed season from August 25 to September 10.

Third. A Sunday closed season from 8 p. m. Saturday of each week to 6 p. m. the Sunday following between the 1st day of May and the 25th day of August.

Fourth. We suggest the mutual recognition by each State of the licenses issued to floating gear by the other State.

Fifth. That the State of Oregon repeal chapter 89 of the session laws of Oregon for the year 1907, relative to the operation of purse seines and other like gear on the Columbia River.

Sixth. We recommend the enactment of similar laws in both States carrying an appropriation of at least $2,500 in each State and providing for the destruction of seals and sea lions and the granting of a bounty on the same, to be $2.50 for seals and $5 for sea lions.

Seventh. We recommend the repeal of both the fish bills passed under the provisions of the initiative and referendum in June, 1907, by the people of the State of Oregon, said bills being designated on the ballot as 318, 319 and 332, 333.

The recommendations were enacted into law by both States, and at the same time the State of Washington in its bill also prohibited fishing for salmon within 3 miles of the mouth of the Columbia between March 1 and May 1 and between August 25 and September 10, or salmon fishing on tributaries of the Columbia, except the Snake, between June 1 and September 15; and also prohibited fishing by any means for salmon save by hook and line in the Kalama, Lewis, Wind, Little White Salmon, Wenatchee, Methow, and Spokane Rivers and in the Columbia River 1 mile below the mouth of any of the rivers named. The agreement was subjected to a rather severe strain, however, when it was discovered that the Oregon Legislature had failed to provide the same closed periods for the tributaries that were enacted for the Columbia, thus leaving the Willamette, Clackamas, Lewis and Clark, and Youngs Rivers and Spikanon Creek open to fishing for 15 days in March and 15 days in April, while the Columbia was closed. The cry of bad faith was at once raised by the Washington fishermen, and for a short time it appeared that the agreement would be broken at the very beginning. The Oregon Board of Fish Commissioners took the matter up, however, and by

order closed these streams to all fishing during the times of closed season on the Columbia, and thus restored peace once more.

The conditions which prevail in Puget Sound adjacent to the boundary between Washington and British Columbia have also been the cause of serious anxiety to those interested in the perpetuation of the salmon fisheries. The great schools of sockeye salmon which are on their way from the ocean to the spawning beds in the Fraser River pass through this section, and it is here that the greater part of the fishing is done. The Province of British Columbia has made earnest efforts to preserve this run, but unfortunately the same can not be said of the State of Washington. The laws are fairly good, but owing partly to the small force and facilities available for executing them and partly to other reasons, they have not always been enforced as they should be.

This condition of affairs on Puget Sound and similar conditions in other boundary waters led the general Government to take up the matter, and on April 11, 1908, a convention was concluded between this country and Great Britain for the protection and preservation of the food fishes in international boundary waters of the United States and Canada. Both Governments appointed international commissioners—Dr. David Starr Jordan for the United States and Mr. S. T. Bastedo (who was succeeded later by Prof. Edward Ernest Prince) for Canada—whose duty it was to investigate conditions prevailing in these waters and to recommend a system of uniform and common international regulations. After an exhaustive investigation the commissioners submitted recommendations, which included the following affecting the boundary waters dividing the State of Washington and the Province of British Columbia, these waters being defined as the Strait of Juan de Fuca, and those parts of Washington Sound, the Gulf of Georgia, and Puget Sound lying between the parallels of 48° 10′ and 49° 20′:

GENERAL REGULATIONS.

3. Disposition of prohibited catch.—In case any fish is unintentionally captured contrary to the prohibitions or restrictions contained in any of the following regulations, such fish shall, if possible, be immediately returned alive and uninjured to the water.

4. Dynamite, poisonous substances, etc.—No person shall place or use quicklime, dynamite, explosive, or poisonous substances, or electric device in treaty waters for the purpose of capturing or killing fish.

5. Pollution of waters.—No person shall place or pass, or allow to pass, into treaty waters any substance offensive to fishes, injurious to fish life, or destructive to fish fry or to the food of fish fry, unless permitted so to do under any law passed by the legislative authority having jurisdiction.

No person shall deposit dead fish, fish offal, or gurry in treaty waters, or on ice formed thereon, except in gurry grounds established by the duly constituted authorities.

6. *Capture of fishes for propagation or for scientific purposes.*—Nothing contained in these regulations shall prohibit or interfere with the taking of any fishes at any time for propagation or hatchery purposes, and obtaining at any time or by any method specimens of fishes for scientific purposes under authority granted for Canadian treaty waters by the duly constituted authorities in Canada and for United States treaty waters by the duly constituted authorities in the United States.

12. *Capture of immature salmon prohibited.*—No salmon or steelhead of less than 3 pounds in weight shall be fished for, killed, or captured in treaty waters.

13. *Salmon weirs, etc., above tidal limits prohibited.*—No salmon and no steelhead shall be fished for, killed, or captured by means of a net of any sort, any weir or any fish wheel, above tidal limits in any river in treaty waters.

14. *Close season for sturgeon.*—During the term of four years next following the date of the promulgation of these regulations no sturgeon shall be fished for, killed, or captured in treaty waters.

15. *Capture of fish for fertilizer or oil prohibited.*—Fishes useful for human food shall not be fished for, killed, or captured in treaty waters for use in the manufacture of fertilizer, or of oil other than oil for food or medicinal purposes.

16. *Naked hooks and spears prohibited.*—No spear, grappling hook, or naked hook, and no artificial bait with more than three hooks, or more than one burr of three hooks attached thereto, shall be used for the capture of fish in treaty waters. This regulation shall not prohibit the use of a gaff in hook-and-line fishing.

17. *Torching prohibited.*—No torch, flambeau, or other artificial light shall be used as a lure for fish in treaty waters.

The following regulations relate specifically to the waters named:

STRAIT OF JUAN DE FUCA AND ADJACENT WATERS.

The following regulations (62 to 66, inclusive) shall apply to the Strait of Juan de Fuca, those parts of Washington Sound, the Gulf of Georgia, and Puget Sound lying between the parallels of 48° 10′ and 49° 20′ north latitude:

62. *Close season for salmon.*—From August 25 to September 15 in each year, both days inclusive, no salmon or steelhead shall be fished for, killed, or captured for commercial purposes in these treaty waters; provided, however, that in the waters to the westward of a line drawn southward from Gonzales Point to the shore of the State of Washington silver salmon, or coho salmon, may be fished for, killed, or captured from September 1 to September 15 in each year, both days inclusive.

63. *Weekly close season for salmon and steelhead.*—From 6 o'clock Saturday morning to 6 o'clock on the Monday morning next succeeding, no salmon or steelhead shall be fished for, killed, or captured in these treaty waters.

It is, however, provided that in the waters to the westward of a line drawn southward from Gonzales Point to the shore of the State of Washington the weekly close season shall begin 12 hours earlier, and shall end 12 hours earlier.

64. *Construction of pound nets.*—All pound nets or other stationary appliances for the capture of salmon or steelhead shall be so constructed that no fish whatever shall be taken during the weekly close season. The erection or addition to the pound net of a jigger is prohibited.

65. *Location of pound nets.*—All pound nets shall be limited to a length of 2,500 feet, with an end passageway of at least 600 feet between one pound net and the next in a linear series, such distance being measured in continuation

of the line of direction of the leader of such net, and a lateral passageway of at least 2,400 feet between one pound net and the next.

On and after January 1, 1911, the mesh in pound nets shall be 4 inches in extension in the leader and not less than 3 inches in other parts of the net.

66. *Nets other than pound nets.*—No purse net shall be used within 3 miles of the mouth of any river and no seine within 1 mile of the mouth of any river in these treaty waters.

No gill net of more than 900 feet in length or of a greater depth than 60 meshes shall be used in these treaty waters.

In Alaska previous to 1906 the conditions prevailing were very similar to those in Oregon and Washington, but in that year Congress enacted a comprehensive and excellent law regulating the fisheries, the enforcement of which was entrusted to the Bureau of Fisheries. The force of agents is still inadequate, although materially increased in 1911, and its facilities for covering the territory are very meager. Conditions approaching the ideal will not prevail until these defects have been remedied; but respect for the fishery laws in Alaska obtains very generally now as a result of their persistent enforcement during the past five years.

VI. METHODS OF PREPARING SALMON.

CANNING.

EARLY DAYS OF THE INDUSTRY.

In the salmon industry canning is, and has been almost from the time of the discovery of a feasible method of so preserving the fish, the principal branch. The first canning of salmon on the Pacific coast was on the Sacramento River in 1864, when Messrs. G. W. and William Hume and Andrew S. Hapgood, operating under the firm name of Hapgood, Hume & Co., started the work on a scow at Washington, Yolo County, Cal. The Hume brothers, who came from Maine originally, had been fishing for salmon in the Sacramento River for some years before the idea of canning the fish had entered their minds, while Mr. Hapgood had previously been engaged in canning lobsters in Maine, and was induced by the Humes to participate in order that they might have the benefit of his knowledge of canning methods. The late Mr. R. D. Hume, who worked in the original cannery and later became one of the best known canners on the coast, thus describes the plant and the methods employed:[a]

Before the arrival of Mr. Hapgood [from Maine] the Hume brothers had purchased a large scow, on which they proposed to do the canning of salmon, and had added an extension to the cabin 18 by 24 feet in area, to be used as a can-making shop. This had a shed on the side next to the river for holding any cans that might be made in advance of the packing season. A few days after the arrival of Mr. Hapgood [March 23, 1864], the tools and machinery were packed and put in position. Mr. Hapgood made some stovepipe and two or three sheet-iron fire pots, and in a short time was ready for can making. The following list of tools and machinery will shown how primitive our facilities were as compared with present methods: 1 screw hand press, 1 set cast-iron top dies, 1 set cast-iron bottom dies, 1 pair squaring shears, 1 pair rotary shears, 1 pair bench shears, 1 pair hand shears or snips, 1 pair 24-inch rolls, 1 anvil (weight 50 pounds), 1 forging hammer, 1 tinner's hammer, 1 set punches for making stovepipe, 1 rivet set, 1 grooving set, 2 iron slabs grooved on one side to mold strips of solder, 1 iron clamp to hold bodies of cans while soldering the seams, 1 triangular piece of cast iron about three-eighths of an inch in thickness and 6 inches in length, with a wooden handle attached to the apex, also used for holding can bodies in place while being seamed.

[a] The first salmon cannery. By R. D. Hume. Pacific Fisherman, vol. II, no. 1, January, 1904, p. 19–21.

The process of canning was as follows: The bodies of the cans were first cut to proper size by the squaring shears, a line was then scribed with a gage about three-sixteenths of an inch from one edge, and they were next formed into cylindrical shape by the rolls. They were then taken to the soldering bench, and one edge lapped by the other until the edge met the line that had been scribed and fastened there by being soldered a small part of the length to hold them in place for the further purpose of seaming. They were then placed either in the iron clamp, which had a piece of wood attached to its under side, and held firmly, the clamp being closed by the operation of a treadle, or were slipped on a piece of wood, which was bolted to the bench, while being held in place by the triangular hand seamer, which was pressed down on the lap of the seam by the left hand of the operator. When this had been done a piece of solder, which had been prepared by shaking in a can together with rosin, was placed on the seam, and melted and rubbed lengthwise of the seam. After cooling the bodies were ready for the end or bottom, which operation was brought about by first cutting out circular blanks with the rotary shears, and then placing them in the cast-iron die, and bringing the handle of the screw press around with a swing with force enough to form up the end or bottom. In this operation there were many difficulties, as the ends or bottoms would many times stick to the upper part of the die and refuse to come off, and finger nails were pretty short in those days. To get the ends out of the lower part of the die was not so bad, as a wooden plunger operated by a treadle knocked them out, but sometimes they were in pretty bad shape. When the bottoms or ends were ready they were slipped on the bodies, and the edge of the bottom rolled about in a pan of powdered rosin until the seam was well dusted. A piece of solder similar in size and preparation as used for the side seam was placed in the can. They were then placed on the smooth side of the cast-iron slabs, and the operator, with a hot soldering copper shaped to fit the circle of the can, melted the solder and, by turning the can rapidly, soldered the full circumference. The output of this can factory was very imperfect, as at least one-half of the seams burst, owing to the lack of experience of the manager or want of good judgment.

When the can making was well underway Mr. Hapgood then turned his attention to getting the apparatus for canning on board the house boat. This in the cooking department consisted of a kettle made of boiler iron about 36 inches in diameter and 5 feet in depth, set in a brick furnace and fired from underneath. Alongside was a round bottom cast-iron pot holding about 60 gallons of water and heated in the same manner. These kettles, with a dozen coolers or circular sheet-iron pans with ropes attached and with holes cut in the bottoms for drainage, a set of 5-inch blocks and tackle, with a sheet-iron fire pot and a scratch awl, completed the bathroom outfit. The can filling and soldering room was furnished with a table through the center, where cutting the salmon in pieces to suit and the filling of the cans was done. On each side of the room there was a bench running the full length, on the end of one of which the cans were placed to receive the pickle, which was used at that time instead of the small quantity of salt that is placed in the cans during the operations of these later days. After the salmon had been cleaned by removing the entrails and washing them outside the covered portion of the scow. they were brought inside and placed on the table, and a man with a butcher knife in one hand and a stick in the other, which had a mark showing the length of the pieces desired, cut gashes in the side of the salmon as a guide, and then cut the fish into sections corresponding to the length of the mark on the stick. He

then proceeded to cut the sections in pieces to suit the cans. Then three or four operators placed the salmons in the cans and shoved them along the table to where a boy wiped the top edge and passed them along to two others who placed tops which fitted inside of the rim. The cans were then taken in wooden trays to the bench opposite the starting point, which was fitted with four sheet-iron pots, and at the one nearest the entrance to the house on the scow a man put a soldering flux on the top edge, which was made by adding zinc to muriatic acid, and then with a pointed soldering copper and a stick of solder melted the solder until a small portion could be drawn around the groove formed by the edge of the can and the bevel of the top. From there the cans were taken to the other parts of the bench, where two men finished soldering the head in, and then taken to the third man, who soldered, or, as it was called, buttoned the end of the seam lap. The cooking department or bathroom, as it was called, was separated from the filling and soldering room by a partition. The cans were shoved through a hole in the partition.

At this time the process was a secret. Mr. Hapgood did the cooking and all the work done inside, no one but a member of the firm being allowed to go in. This privacy was continued until the firm moved to the Columbia River and, the labor becoming too arduous for Mr. Hapgood to perform alone, a boy by the name of Charlie Taylor was taken in as an assistant. * * *

But to return to the original proposition: When the filled cans had been soldered and entered the bathroom they were put in the coolers and lowered into the cast-iron pot, one cooler of cans being cooked at a time. The cooler was lowered into the boiling fresh water until the cans were submerged to within 1 inch of the top ends and left to cook for one hour; then they were hoisted out and the vent holes in the center of the top soldered up, after which they were dumped into the boiler-iron kettle, which held a solution of salt and water of density sufficient to produce, when boiling, a heat of 228° to 230° F. They were cooked in this solution for one hour and then taken out of the kettle with an iron scoop shaped like a dip net, with a wooden handle about 6 feet in length. They were dumped into a tank of water on the other side of the partition which separated the bathroom from the packing room through an opening in the partition, receiving many a bump and bruise in the operation. Then they were washed with soap and rag to remove the dirt and grease, each can being handled separately. When this was done they were piled on the floor of the packing room and in a few days were painted with a mixture of red lead, turpentine, and linseed oil, for at that time buyers would have no canned salmon, no matter how good the quality, unless the cans were painted red.

When packs of 10,000 to 15,000 cases were made in a season only the absolutely essential machinery was used, the rest of the work, such as cutting and cleaning the fish and placing them in the cans, being done by hand. When larger canneries were constructed, especially in Alaska, where labor is expensive and difficult to obtain, the greater part of the workmen having to be brought up from the States, machinery to do as much as possible of the work became absolutely essential. The inventive genius of the country came to the rescue and one by one machines for cutting and cleaning the fish, filling the cans, putting the tops on, and washing them, were invented and put into use, while automatic weighing machines were produced and extensive improvements and alterations were made in the machines previously in use. There are to-day many large manufacturing es-

tablishments which devote all or the greater part of their facilities to furnishing machinery and supplies to this giant branch of the salmon industry.

When salmon canning was in its infancy a pack of from 150 to 200 cases was considered a good day's work. Now it is not an uncommon occurrence for a cannery to turn out from 1,500 to 2,000 cases in one day, and there are a few which have even greater capacity.

During the height of the salmon run a cannery is an exceedingly busy and interesting place, and a description of the methods used at the present time will show the giant strides the industry has made since the days of Hapgood, Hume & Company.

HANDLING THE SALMON.

At convenient spots near the fishing grounds large scows and lighters are anchored and the fishing crews deliver their catches aboard these, the tallyman on each scow keeping a record and giving the crew a receipt. Men fishing near the cannery deliver their catch alongside. Steamers and launches are used to tow out empty scows and bring in those filled. In the old days the fish were pitched by hand into bins on the wharves, but this laborious method has been superseded by the use of an elevator, which extends from a short distance above the top of the wharf to the water's edge, provision being made for raising or lowering the lower end according to the stage of the tide. This elevator is slanting, and is made of an endless chain operating in a shallow trough. About every 2 feet there is attached to the chain a crosspiece of wood. At the top of the elevator are chutes which deliver the fish at various convenient spots on the cutting-room floor.

At a few places tracks have been run down to the low-water stage and the steamers, launches, and scows come alongside these, small cars being run down to meet them, and be filled by men pitching the fish from the boats, the cars when filled being run up into the cutting room and dumped upon the floor. At other places men armed with pews (single-tined forks) pitch the fish up to the wharf, where other men pitch them to the cutters.

If the salmon have been in the scows for from 20 to 24 hours they are used as soon as possible after being delivered at the cannery; otherwise that length of time is usually allowed to elapse, the cannerymen claiming that if not allowed to shrink the fish will be in such condition that when packed much juice will be formed, so that in "blowing," after cooking, light-weight cans will be produced. The danger of canning fish that are too fresh, however, is of minor importance as compared with the tendency in the other direction.

Before dressing the fish a stream of water is kept playing over them in order to remove the dirt and slime, after which men with pews separate the different species into piles.

DRESSING.

The majority of the canneries still use the old hand method of dressing the fish, and in such places the selection of the butchering or dressing gangs is of prime importance. Two men constitute a "butcher's gang," and the number of these gangs is dependent upon the output of the plant. Boys place the fish, with the head out, upon the cutting tables. One man cuts off the heads, and is followed by another who removes the fins, tails, and viscera. The offal is thrown into a chute, whence it passes into the water under the cannery, while the dressed fish is transferred to a tank of water, to be scaled, washed, and scraped. It is then passed to another tank of water, where it receives a second washing, scraping, and final brushing with a whisklike broom, which removes any offal, blood, and scales that were overlooked in the first washing, after which it is removed to large bins on either side of the cutting machine.

The most useful cannery inventions in recent years have been of machines for doing the work of the dressing gangs. Several have been invented and work more or less satisfactorily. The one now in general use in canneries where such machines are employed was first used in 1903 at Fairhaven (now Bellingham), Wash. It removes the head, tail, and fins and opens and thoroughly cleans the fish ready to cut into pieces for the cans. By the use of these machines the dressing gang is almost entirely done away with, dispensing with 15 to 20 men.

CUTTING.

The usual method of cutting the salmon is by a machine. This is generally a large wooden cylindrical carrier, elliptical in shape, thus having a larger carrying capacity. Ledges or rests on the outside the length of the carrier are wide enough to hold the fish, and are slit in cross section through the ledges and outer casing to receive the gang knives. The latter are circular, fixed on an axle at the proper distances apart, and revolve at the highest point reached by the carrier and independently of the latter. The carrier and gang knives are set in motion, each revolving on its own shaft. As a rest on the carrier comes to a horizontal position, men stationed at the fish bins lay a fish on each ledge as it passes. Thence it is conveyed to the revolving gang knives and, after being divided, passes through on the downward course, sliding off the rest into the filling chute. The knives in these machines are so arranged as to cut the fish transversely in sections the exact length of the cans to be filled.

The rotary cutter shunts the tail pieces to one side, and these are carried by means of a chute to baskets. But few of the larger tail pieces are canned, the rest being thrown away, this forming a con-

siderable part of the tremendous annual waste of the salmon canneries. As the tail portion is much smaller, with less meat, it can not be placed in the cans with the middle and head sections without detracting from their value, but if packed under a distinct and separate label, as is now done in a few canneries, there is no reason why the tails should not supply the demand for a cheap grade of fish.

In some of the smaller canneries, especially in those packing flat cans, the gang knives are worked by hand. In this case the knives are not circular, but elongated or semicircular in shape, tapering at the outer ends. They are mounted on an axle having a large iron lever at one end, and when this lever is raised the ends of the gang knives are thrown up and back. The fish is then placed in position under them and the lever pulled forward, the knives, with a scimitar-like movement, dividing the fish.

The original method of cutting was by means of a long knife wielded by a Chinaman who stood at a regular butcher's block. Although his strokes were incredibly quick, the rotary cutting machine is a vast improvement over the old way.

SALTING.

Every can of salmon is seasoned with one-fourth of an ounce of salt, which, to insure uniformity, is added by mechanical means. A table is used, in the top of which are holes equal distances apart. On the under side of the top is a sheet-iron plate, with an equal number of holes, which slides in a groove at the sides, and is worked either by a hand or foot lever. Just below is an open space large enough to accommodate a tray holding 36 or 48 cans. A workman stands in front of the table and slides a tray of cans into the open space. He then throws a quantity of salt upon the table and immediately scrapes this off with a thin piece of wood, each hole being filled in the operation, and the salt being prevented from falling through by the iron plate underneath. The lever is then pressed, the iron plate moves forward until the holes in it are directly under the table top, when the salt drops through into the cans. This operation can be repeated four or five times in a minute.

FILLING THE CANS.

Most canneries now use filling machines, although a few, more particularly those packing flat and odd-sized cans, still fill by hand.

The filling machine consists of a chute with a belt to which are attached wire racks about 4 inches apart, set at an angle to prevent the salt from spilling out, into which the salted cans are fed from the floor above and pass into the machine. At the same time the divided sections of salmon pass down another chute into the mouth of what

looks like a hand coffee mill. They pass through here down a smaller chute and are forced by two dogs into a receptacle through which the plunger, or filler, passes. Here the plunger comes opposite the open mouth of the empty can, which when it reaches this point is caught by a clasp or hook and held in front of the plunger, which is immediately thrust forward through a chamber filled with salmon, cutting the fish longitudinally and at the same time filling the can. The next movement forces the can out upon a table. When running at full speed one of these machines will fill about 80 cans a minute.

On being released by the clamp the cans roll upon a long table and are picked up by a man stationed here, who strikes each one upon a square piece of lead set in the table, in order to settle the contents down into the can and for the purpose of detecting any deficiency in weight. If not quite full the cans are pushed to the other side of the table, where a man adds the quantity of fish needed, a supply of small bits being kept at hand for this purpose. Generally the cans overrun in weight, frequently as much as an ounce. Occasionally a can is weighed in order to see that the machine is in perfect adjustment.

In the hand method the fillers stand on each side of a long table with a trough running down the middle from end to end. This is filled with the cut pieces of salmon, and the fillers, usually women and children, put into the cans large pieces at first and then smaller pieces to occupy the vacant spaces.

WASHING THE CANS.

The cans are put upon an endless belt by a workman and pass from the filling-machine table to the washing machine. This is a rotating apparatus, consisting of an iron framework holding 10 rests or stands on which the cans sit. Immediately overhead are small perpendicular shafts with an iron cap, the diameter of a can, fixed to the end of each. Each can as it reaches the machine is caught by one of the washers and the cap brought down over the top, a tight-fitting flange preventing water from getting inside. Revolving rapidly as it goes, with a stream of water against it of sufficient force to remove the dirt and grease, the can is carried until the machine has revolved 180 degrees, when it is released and passes out on a belt. A more modern method is to use jets of steam for washing, while one of the latest devices is to clean the cans by a cold-air blast which strikes directly on the top edge. A set of brushes against which the cans revolve is used in a few canneries.

After being washed the cans continue on an endless belt and pass two children whose duty is to put a small piece of scrap tin on the top of each. These pieces are called "chips," are from 1½

to 2 inches, and are scraps from the sheet tin used in making the tops of the cans. The shape is of no particular importance so long as the pieces are long enough to cover the hole in the top of the can, or the cap as it is called.

CAPPING.

The endless belt delivers the can to the capping or topping machine. On reaching this the can passes under a cap holding a top, the latter being fed in through a separate aperture, and the cap immediately falls with just sufficient force to put the top on the can without injuring either. The can is then forced out from under the capper by the rotation of the machine, and the next capper is brought around to receive another can. As the cans revolve they are carried under a crimper, situated directly opposite the capper, which presses the edge firmly around the body. While one can is being topped another is being crimped, after which it rolls out upon a belt on its side, and is taken through the acid trough. Before the tops are sealed the edges must be treated with a solution of muriatic acid, which is in a glass receptacle and is applied as the cans are rolled through the acid trough on the endless belt.

SOLDERING.

For many years the tops and also all other parts of a can were soldered by hand, a long, tedious, and expensive process, which eventually gave way to the soldering machine. This is composed of an endless chain about 6 feet long, revolving around two shafts at either end of an iron trough. In the bottom of the trough is the solder, which is kept at molten heat by a row of oil blast jets underneath. Between the lower part of the chain and trough is just enough room for a can to pass without jamming, and they are forced along the trough by a chain in contact with their sides. They enter the trough at an angle, their bottoms slightly inclined, which causes the top rim to be submerged in solder, thus distributing it evenly all around the edge.

In passing through the trough the cans make about half a dozen revolutions, which cause the tops to become very hot, and it is to prevent them from being blown off by the pressure of the steam which quickly generates that the center hole in the top is made. The "chip" previously mentioned prevents the hole from being choked with salmon.

A soldering machine having, instead of the endless chain to give motion to the cans, a metal spiral running the length of the machine and revolving on an axle through the center, is used in some canneries. Each loop grasps a can and follows it to the end, thus giving the cans the proper motion and preventing them from rolling

side by side and lapping the solder over the ends, as is frequently the case with the chain machines.

A few canneries use a revolving cooler, which has a disk upon which the cans rest. This disk is filled with running water, and after it makes two revolutions the cans are forced into an inclined trough under a stream of water. The usual method, however, is for the cans on leaving the soldering machine to pass under several jets of water to set the solder and at the end of the belt to be transferred by workmen to coolers or crates, which are made of flat strap iron, square shaped, and hold about 96 cans. The crate having been filled, it is placed upon a square truck and rolled aside, where the vent holes are stopped with a drop of solder.

TESTING.

The testing tank is a square wooden tank filled with water heated almost to the boiling point by steam pipes arranged in a coil at the bottom. The crates are hoisted into the test tank by a block and tackle attached to an overhead track, which permits the coolers to be swung to any place desired.

This test is for the purpose of detecting leaks due to imperfect soldering and is conducted by two workmen skilled in this operation. The slightest leak is detected by the appearance of small bubbles issuing from the cans. The spots where the bubbles appear are marked with a small iron tool held in the hand, and the cans are taken out and placed in small wooden trays, in which they are carried to the bench men, whose duty it is to mend them. Cans that have been mended are again tested as before. The bench men are located in front of a long bench on which are numerous fire pots, supplied with oil and air led through small tubes, in which the soldering irons are kept heated, the heat and air being regulated by connecting valves. Kerosene oil and gasoline are the fuels generally used now.

COOKING.

The salmon are invariably cooked in rectangular retorts which rest in a bed and have a track running the long way. In front of each is a turntable for the purpose of receiving trucks coming from any direction. Four trucks each holding 6 crates of cans, piled one upon another, are run into the retort, which is then closed and steam turned on, entering at the bottom. The amount of pressure is from 6 to 12 pounds, the heat 250° F. In most establishments the first cooking is continued about 60 minutes.

After the first cooking the crates are taken out and placed on a long table called a "venting table," where the cans are pricked with a wooden-headed hammer fitted with a small brad, to allow the steam

and superfluous water to escape. After the venting has been done the holes are soldered up, the crates again loaded on a truck and rolled into the second retort, where they are subjected to the same pressure of steam and heat as in the first cooking and for a period of about 60 minutes.

In some canneries the retorts for first cooking are made of heavy plank, well bolted to resist the steam pressure.

In the early days much secrecy and mystery was thrown about the cooking, and the work was carried on in a separate room, known as the "bathroom," under lock and key. The first cooking was done in common tubs. The early retorts were made of wood. Later, round iron kettles were substituted, nearly one-half consisting of cover, and round crates were used for holding the cans.

For many years cannery men believed that the double cooking of salmon was absolutely necessary, but in 1898 Mr. F. A. Seufert, at his cannery on the Columbia River, at Seuferts, Oreg., a short distance above The Dalles, discarded this idea, and has since used a one-cooking method. By the new process the cans are tested for leaks after the center hole in the top is soldered up, as before, and are left in the retort 70 minutes at 245° F. and 12 pounds steam pressure. According to its originator, this method saves more than one-half the labor in the bathroom, saves nearly one-half the labor in washing the cans after cooking, and also better retains the color of the fish.

SANITARY, OR SOLDERLESS, CANS.

A recent improvement in the canning business, and one which accomplishes the same purpose as the single cooking in retorts, is that of "sanitary cans," so called. In order to use these cans a quite radical, but economical, change in machinery is necessary. As the cans leave the filling machine they pass into a steam exhauster, consisting of a box about 30 feet in length, in which are three endless-chain belts running side by side. Under and over each belt are steam coils, and under each of the lower coils are single pipes, which through small holes throw jets of live steam upon the coils, creating an intense heat. The cans pass along the first belt, are then transferred to the second belt, on which they return to the entrance of the box, whence they pass to the third belt, and continuing along this to the end pass out to the topper and crimper, the whole operation occupying five minutes' time. One style of exhauster has 10 ovals formed by the pipe, and the cans pass along these from side to side of the exhauster until discharged at the far end. By this means the contents of the can are heated and the greater part of the air exhausted, which is the object of the first cooking in the retort under the method in general use.

The topper and crimper is a circular machine with six rests for the cans. The first work performed by the machine is to "true up" the upper edge of the can, which is done by a plunger that presses the upper flange of the can upon a shoulder. In the meantime the top, which is coated around the outer edge with cement, has been automatically fed into the machine, is now clamped on the can, and by another operation is crimped on tight. The cans then leave the machine on an endless conveyer and pass to the men who transfer them to the coolers, and these are immediately placed upon the trucks and run into the retort for the one cooking they are to receive. The time they are to remain here is somewhat variable, 70 to 125 minutes with a temperature of 242° F. being the common period.

By the use of these cans the soldering machine, and in fact all use of solder and acid, is done away with, a distinct sanitary improvement, for sometimes the substances would get into the can and cause a deleterious chemical change in the contents. It also does away with the first cooking and the subsequent venting and soldering, a saving both in labor and time consumed.

REPAIRING CANS.

Imperfect cans which are repaired before the first cooking are naturally in the same condition as if there had been no defects. If the leaks are discovered after cooking and are repaired at once and the contents recooked, they are still very good, the only difficulty being that by blowing or venting them a second time they lose weight. The above goods usually go in with the regular pack of their kind and are not classed as regular "do-overs."

When, however, a cannery is running at full capacity, defective cans can not always be repaired and recooked at once and are sometimes set aside for days. Decomposition follows, of course, as with any other meat that is exposed to the air, and the fish becomes unfit for food. When recooked the meat becomes mushy and the blowing or venting makes the cans very light, a defect which is frequently corrected by adding salt water. This, the "do-over," is the lowest class of goods. In the old days, and even yet to some extent, such cans are sold without labels to brokers, or else are given some indefinite label, perhaps with the name of some fictitious cannery, and sold in the lumber, mining, or negro districts, or shipped to foreign countries with less fastidious tastes in the matter of salmon. In 1910 one of the leading companies of Alaska adopted the policy of throwing overboard all "do-overs."

On coming from the second retort the crates are lowered into a bath of lye, or, as in some canneries, the cans are run through such a bath on an endless belt, which, with the aid of a slight rinsing and a

few rubs with a brush over the top, removes from the can all the grease and other material, and then passes them into another bath where the lye is washed off in hot fresh water. The cans then go to the cooling room, where a stream of water is played upon them, or, during rainy weather are placed out of doors upon the wharf, and there allowed to cool.

The top and bottom of the cans contract in cooling, and for several hours a sharp popping noise is heard. Here, as in nearly every process through which they pass, the cans are again tested, this time by tapping the tops with a small piece of iron about 6 inches long, or, sometimes, a 12-penny nail. The sound conveys to the ear of the tester an unmistakable meaning as to the condition of the can, and the faulty cans that escape notice during the other tests are invariably found in this one.

LACQUERING.

An almost universal custom in the salmon-canning industry, but one that is not common in the canning of vegetables, fruits, etc., is that of lacquering the cans. This idea of protecting the can on the outside has been followed from the very beginning, for two reasons: (1) That the English market which, at that time especially, absorbed the greater part of these goods, insisted on their shipments being finished in this way, and (2) from the fact, as these canners speedily found out, that if they did not protect their cans in some way enormous losses through rust would ensue.

The first experiment of this nature was to paint the cans by hand with red paint, treating each singly. Next a composition of logwood extract and alcohol was tried, which, however, did not produce satisfactory results for a very plain reason—the can was dyed instead of being lacquered. The next attempt was to varnish the cans with a japan varnish reduced with alcohol, but this was found to dry too slowly for speedy handling. After extended experimentation the quick-drying brown lacquer of the present time was evolved, which carries asphaltum in the form of an asphalt varnish as its base, this being supplanted in some cases by gilsonite. This lacquer can be procured in either a heavy or light body, is generally reduced with benzine or gasoline, and is applied according to the requirements of the market, which in some localities demands a heavy coating and in others a much lighter finish, the latter giving a rich golden brown color. Some experiments have also been made in using brighter colored lacquers for this work. Several of these, made to give a bright golden, copper, or other color, are extremely attractive in appearance, while at the same time protecting the tin against rust quite as well as the brown.

The industry soon outgrew the hand method of lacquering, and the process which for a number of years was universal in the trade, and is still used by some canneries, succeeded it. For this there are a number of rectangular box vats about 40 by 80 inches and 18 inches in depth, the number varying with the capacity of the cannery. These are usually lined with galvanized metal and provided with a gridiron-shaped iron frame, hung from a windlass or other tackle for lifting or lowering from top to bottom of the vat. The cans are loaded on this gridiron, being placed in an inclined position to allow the draining of the lacquer, and are lowered in the vat sufficiently to submerge them in the lacquer with which the vat is charged to a depth of 7 to 10 inches. The loaded gridiron is then raised to the top of the vat and the cans allowed to drain and dry before piling. This method, while being more effective in regard to the volume of work, was still of necessity a very slow and tedious operation. In damp or rainy weather, especially when it is not possible to open warehouse doors and windows, the gas arising from a number of these vats makes effective drying almost impossible.

Another principal objection to this method of lacquering, which applied also to all earlier attempts, was the impossibility of obtaining an even coat of lacquer when the can was allowed to dry in any stationary position. There was also a large waste by evaporation.

Notwithstanding repeated efforts at invention, however, it was not until 1901 that an effective machine for handling this difficult work was put on the market. The apparatus now in use by a number of canneries receives the cans on a revolving wheel fitted with rests for holding them while passing through the lacquer bath. From here they roll upon an endless chain which revolves the cans as they pass through a long box in which a hot blast dries them before they reach the end of the machine. The rotating or rolling motion given to the can after the lacquer bath, preventing the lacquer from draining to and consequently accumulating on any part of its surface, also has the effect of distributing the lacquer evenly and results in a clean and neatly finished can. The air blast facilitates the work of drying to such an extent that it requires only about two minutes after being deposited on the drying bed of the machine for the cans to be ready for handling, while the quantity of cans which can be handled in a day is vastly greater than by the old method.

A few flat and oval cans are not lacquered, but are protected from rust by wrapping in tissue paper, over which the label is placed.

LABELING.

While machines have been made for this purpose, and some of them are in use, the work is usually done by hand. A number of men

seat themselves about 4 feet apart in front of the pile of cans. Each man has in front of him a package of several hundred labels, and by bunching them on a slant so that successive margins protrude beyond each preceding, he can apply paste to the entire number with one stroke of the brush. A can is placed on the label, is quickly rolled, and the label is on much quicker than one can tell it. Each man places to his right the cans he labels, forming a pile of length and width equal to his unlabeled pile, and when the entire lot has been labeled it has been shifted only about 4 feet. Cans of fancy brands of salmon put up on the Columbia River and in the Puget Sound region are wrapped in colored tissue paper before the label is put on. Cartons similar to those used by the sardine packers would make good containers for fancy brands and would be much cheaper than the present method.

Several attempts have been made to popularize salmon packed in glass and porcelain jars, and while these have met with some favor, it was not sufficient to warrant a continuance of the practice for any length of time. None are being so packed at the present time.

BRANDS.

A very important feature of the canning industry is the selection of appropriate brands or labels for the various grades of salmon. Each company has a number of these, which it has acquired either by designing them or by absorbing another company which owned them. A well-known brand has a value in itself and sometimes is a very important asset. A company will sometimes market a considerable part of its product in one section, and here, where the consumer has become familiar with the brand and pleased with the contents of the can, he will ask for and accept no other, despite the fact that the latter might be, and probably is, the equal of the product he has been using.

Up to a few years ago one of the most serious evils in the trade was the use of misleading and lying brands. The high-grade product would almost invariably be correctly and fully branded, but "chums" and "pinks" were usually branded as "Fresh salmon," "Choice salmon," etc., which would deceive all persons but those well acquainted with the industry. "Do-overs" and very poor fish were usually marketed under a brand which bore the name of a fictitious company or of no company at all.

The passage of State laws of varying degrees of efficiency governing the branding of salmon helped slightly to remedy this condition of affairs, but it was not until the Pure Food and Drugs Act, approved June 30, 1906, was put into force by the Government that any radical improvement was noticeable. At the present time but few misleading brands are in use.

BOXING OR CASING.

A case of salmon generally contains 48 one-pound cans or their equivalent, i. e., 24 two-pound cans or 96 half-pound cans. Some canneries pack their half-pound cans in cases of 48. These cases are usually made of wood and cost from 9 to 11 cents each knocked down.

CAN MAKING.

Some of the canneries in the coast States purchase their cans ready made, but the usual method is to purchase the sheet tin and make up the cans in the canneries. This is especially necessary in Alaska, as it would be impossible to find room on the cannery ships for such a bulk as they would make in addition to the other supplies necessary. Furthermore, the making of cans provides work for a large part of the crew, otherwise unemployed while the rest are getting ready the other necessary paraphernalia. The work is done by machinery and occupies several weeks' time.

MILD CURING.

The beginning of the business of mild curing salmon, or "sweet pickling," as it is sometimes called, is of comparatively recent date. In 1889 a German dealer came to the Columbia River and tried to interest some of the cannery men in the business. Messrs. J. O. Hanthorn, M. J. Kinney, and J. W. Cook were persuaded to prepare some, and the plant of the Northwest Cold Storage Company, at Portland, was used to keep the fish at a low temperature during repacking and preparation for shipment. These fish were shipped to Germany, but the shippers received no financial returns, word coming back that the fish were not satisfactory.

Owing to this lack of success from the first effort no further attempt was made until 1894, when Mueller & Loring, of Chicago, put up a carload of mild-cured salmon at Kalama, Wash., and shipped it to Germany. In 1896 Charles Ruckles and Wallace Brothers, of Kalama, packed several carloads for the German market. It was not until 1898 that the business was permanently established on the Columbia, the Trescott Packing Company and S. Schmidt & Sons putting up plants at Warrenton and Astoria, respectively.

In 1900 the Trescott Packing Company began packing the spring and fall runs, and the Sacramento River Packers' Association packed the fall run, on the Sacramento River, the business being carried on here every year since.

In 1901 the Sacramento River Packers' Association began at Monterey the mild curing of the spring salmon that were taken with hook and line in the open ocean.

S. Ellmore & Company started the industry in 1902 at Tillamook, and the business began on Puget Sound in 1901, when the San Juan Fishing & Packing Company and the Seattle Fish Company took it up.

Prior to 1906 several of the Alaska cannery men put up each season a few tierces of mild-cured salmon, but it was not until this time that the industry really began as such. In that year J. Lindenberger (Inc.) started packing at Ketchikan, Alaska. The following year several other plants were started, and in 1910 almost all of the king salmon taken in southeast Alaska were mild cured.

In mild curing the fish are split down the middle, the head, tail, and all fins except the pectorals removed, and the backbone cut out. The fish is then in two halves. Each of these halves, or sections, is then scored on the outside eight or nine times with the knife. They are then thrown into a cleaning vat, and here the inner side of each section is carefully scraped clear of blood and membrane with a knife, while the outside is thoroughly cleaned with a scrubbing brush. The sections are then laid carefully inner side up in another vat partly filled with clear, cold, running water, or into a tierce partly filled with fresh water and cracked ice, in which they remain for an hour. Formerly the fish were put into brine, but it has been found that ice water answers the purpose much better. After being thoroughly cooled, the sections are salted down in the tierces, each one being laid with its tail toward the center. Usually about 50 whole fish are required to fill a tierce. The fish are but lightly salted, and owing to this fact must be kept in cold storage until used.

In the early days of the industry different preparations, which included salicylic and boracic acids, were used to help preserve the fish. This caused much complaint from the Germans, and finally their Government subjected our product to a rigid inspection, with most salutary results, as now it is one of the purest and best products put up on this coast, the use of acids being done away with entirely.

The king salmon is almost invariably the species mild cured, being the only one large enough to answer the requirements of the trade. In 1907 a Ketchikan, Alaska, packer put up a quantity of coho, dog, and humpback salmon, but he found so much difficulty in disposing of the product that he abandoned further efforts in this line.

The principal consumers of the mild-cured salmon are the smokers, who take them from the tierce, wash them for a few minutes, and then have a practically fresh fish to smoke, and not, as in the days when hard-pickled salmon were used, one that had lost most of its oil and flavor through the excessive amount of salt needed to preserve it.

The greater part of the product put up on this coast goes to Europe, Germany being the principal consumer, but considerable quantities are sold in Norway, Sweden, and other countries, while the smokers of the cities east of the Rocky Mountains use large shipments every year.

PICKLING.

The earliest method of preserving salmon on the coast was by pickling. At times this industry attained to large proportions, but during the last 10 years it has been declining, largely because of the increasing popularity of mild-cured salmon. All species of salmon are pickled, but the most popular is the red salmon.

In dressing salmon for pickling the heads are removed, the fish split along the belly, the cut ending with a downward curve on the tail. The viscera and two-thirds of the backbone are removed, and the blood, gurry, and black stomach membrane scraped away. The fish are then thoroughly scrubbed and washed in cold water. They are next placed in pickling butts with about 15 pounds of salt to every 100 pounds of fish. The fish remain here about one week, when they are removed, rubbed clean with a scrub brush, and repacked in market barrels, one sack of salt being used to every three barrels of 200 pounds each. About 40 to 52 red salmon, 25 to 35 coho salmon, 70 to 80 humpback salmon, 10 to 14 king salmon, and 25 to 30 dog salmon are required in packing a barrel of pickled salmon.

A few salteries also pack "bellies." This product is merely the belly of the fish, which is the fattest portion, and as most of the packers threw away the rest of the fish, thus causing a very large waste of choice food, this method has come under the ban of the law in some of the coast States and in Alaska. As a result but few "bellies" are packed now, and most of these only when some economic use is made of the remainder. Humpback salmon furnish the major part of the "belly" pack.

DRY SALTING.

During the progress of the Russian-Japanese War the preparation of dry-salted dog salmon became an important industry, but as soon as the Japanese fishermen resumed their former occupations the demand fell off so much that the industry was virtually abandoned in the United States, although a number of Japanese continue it in British Columbia. The fish, after being dressed, were packed in boxes, in salt, these boxes holding about 560 pounds of fish, and were shipped in this condition to Japan.

At a number of places in Alaska the bellies of red and coho salmon are cut out and salted, after which the backs are dried in the sun and,

thus cured, are used for fox food at the numerous fox ranches. This product is called "ukalu."

SMOKING.

The smoking of salmon is virtually a continuation of the pickling, as the fish must be pickled before being smoked, the main purpose of the pickling being to preserve them until the time arrives for smoking, which may be weeks or months after the fish are caught. For smoking them the salmon are taken out of the barrel and soaked until as much as possible of the salt is removed. They are then put into the smokehouses and subjected to the heat and smoke of a fairly hot fire for about two days in order that they may be thoroughly dried and hardened. Exposure to a smoldering fire (alderwood is a favorite fuel) for about three days completes the process.

For shipment smoked salmon are packed in wooden boxes, oil paper being placed between the fish.

A variation of the smoking process is known as "kippering." With this method the salmon are dried in a hot fire for about 20 hours and then smoked over another hot fire for about 24 hours. The "buckling" process is also similar to this.

Dog and king salmon are often cut into steaks and kippered. As the sale of white-meated king salmon is somewhat hampered by the whiteness, the smokers use a coloring preparation, known in the trade as Zanzibar carmine. This gives the outside of the fish a deep-colored red gloss, but leaves the inside its natural white color. The steaks are wrapped in paper and packed in baskets holding 10 pounds each.

A smoked product known locally as "beleke," is put up at Kodiak, Alaska, from red and coho salmon. Steelhead trout are the best for this purpose, but are not often utilized owing to their scarcity in this region. In preparing "beleke" only the backs of the fish are used, the belly part being cut out and pickled separately. The backs are divided into three grades, according to size, viz, "small," "medium," and "large." They are first put into a brine, the "large" being put in first, followed by the "medium" and "small" at intervals of 1 hour each, so that all will be cured at about the same time. The coho backs, being the largest, are kept in the brine from 19 to 20 hours, while the red salmon backs, which are smaller, remain in the brine only about 16 hours. After being thoroughly salted the backs are removed from the brine and rinsed in fresh water, then hung in the air for about 24 hours to dry and to allow a thin skin to form on the outside. They are then hung in the smokehouse, in the presence of a little fire of cottonwood or alder. On dry days the gable windows are thrown open and the wind allowed to

pass through while the smoking is going on. The smoking must be done slowly, two weeks being devoted to it.

There is a good demand for this product locally, the fish selling for from 15 to 20 cents a pair, but little effort has been made to extend its sale outside of central Alaska.

FREEZING.

The process of preserving fish by freezing was first introduced in 1888. Previous to this the comparatively ancient method of packing with ice, or in rare instances letting the fish freeze naturally during the winter months, was followed. Packing with ice is in quite general use to-day for shipments of fish which are to be preserved for short periods of time. Cooling with ice never results in a temperature lower than 32° F., which, of course, does not freeze the fish.

The freezing of salmon and steelhead trout began on the Sacramento and Columbia Rivers in the late eighties. It was taken up in a small way on Puget Sound in 1892. That year Wallace Bros. and Ainsworth & Dunn froze a small lot, and the venture was so successful that the next year nearly all of the wholesale dealers on the Sound took up the business. In Alaska the preparing of frozen salmon began in 1902. The San Juan Fishing & Packing Company, soon to be succeeded by the Pacific Cold Storage Company, put up a cannery and cold-storage plant at Taku Harbor, in southeast Alaska, in 1901, though it did not operate the cold-storage portion until 1902. This is the only plant which has operated in Alaska, although the New England Fish Company erected in 1909 a large plant at Ketchikan for the freezing of halibut primarily, but will probably freeze salmon also.

The freezing of salmon is almost invariably carried on in connection with other methods of handling and preserving, and the purpose is usually to secure the fish when numerous and cheap, freeze them, and then hold them until the runs are over and the fish are once more in good demand at high prices. The business proved so profitable, however, that the dealers began to look for wider markets for their product. Europe, more especially Germany, was prospected and a profitable market soon delevoped, with the result that to-day frozen Pacific salmon can be secured in nearly every town of any size in western Europe, while large quantities are marketed all over our own country.

There are four important features in packing and using frozen salmon: (1) To get fresh fish; (2) to keep them cold (about 15° above zero) after they are frozen; (3) to keep a coat of ice on them, and (4) to allow them to thaw slowly in cold water before cooking.

In selecting salmon for freezing only the finest and freshest of each species are used. The current belief that freezing destroys the flavor of the fish is erroneous, the flavor depending entirely upon the condition before freezing, and the quicker they are frozen after being caught the better will the natural flavor of the fish be preserved. Frozen salmon are just as wholesome as fresh, and their chemical constituents are almost identical. The danger lies in the temptation to freeze the fish after decomposition has set in, but, fortunately, this is now very rarely practiced in the salmon industry.

The coho, or silver, and the chum, or dog, salmon are the choicest of the salmons for freezing. The other species except the red, or sockeye, which is too oily and rarely frozen, are also frozen in varying quantities. The steelhead trout, which is ranked by the Pacific coast dealers among the salmon, is considered the choicest fish of all for freezing.

One of the most modern plants on the coast—that of the New England Fish Company, at Ketchikan, Alaska—has four freezers, each 25 feet by 10 feet 6 inches, in which a temperature of from 25° to 30° F. below zero can be maintained if desired, although a temperature of more than 10° below zero is rarely ever required. All freezing is by direct expansion and each freezer is piped with about 2 feet of 1¼-inch pipe per cubic foot of freezing space. The bunkers in the freezers are in pairs, each nine pipes wide, spaced 10 inches apart. This leaves a 3½-foot passage through the center of each freezer opposite the 3½ by 6½ foot swing doors. The salmon are laid on pans, which are placed on the tiers of pipes.

After freezing, the salmon are passed through openings in the rear of the freezers into the glazing room, which has a temperature of about 20°F., where they are dipped into water, and when removed are covered with a thin glaze of ice, which may be thickened by repeated dippings. This is an extra precaution to exclude the air from the fish.

After being thoroughly frozen and glazed, each fish is covered first with a parchment, like rolls of butter, and then with a piece of heavy brown paper. They are then packed in boxes holding about 250 pounds each, placed in the cold-storage cars and shipped.

MISCELLANEOUS PRODUCTS.

A few years ago a company on the Columbia River put up what was known as "fish pudding." In preparing this the salmon was ground fine, mixed with milk and eggs, and then packed in tin cans. The preparation was soon abandoned.

In 1903 one of the Point Roberts canneries packed a new product which was called "salmon paste." For this the fish was ground up,

cooked, seasoned with spices, etc., and made into fish balls, a very palatable dish when warmed over.

In 1905 a Seattle concern began the manufacture of wienerwurst sausages from halibut and salmon.

The Indians in the Bristol Bay region of Alaska occasionally dress the skins of salmon and make of them leather for the tops of boots, also bags and other small articles.

Every year immense quantities of salmon roe are thrown away in the fisheries of the west coast, though there is but little doubt that, if properly prepared, a market could be found for this now waste part of the fish. In France there is a good market for a product known as "rogue," which is the spawn of cod, haddock, hake, and pollock salted in casks, and which is used as bait in the sardine fisheries. Salmon spawn is the choicest and most successful bait used on this coast, and if properly prepared would undoubtedly answer the purpose as well, if not better, owing to its oiliness and attractive color, than the regular "rogue." The roes should be soaked for some days in old brine and then packed in strong casks holding about 25 gallons each. It might also prove to be a good bait for tolling mackerel on the Atlantic coast.

In 1910 a considerable quantity of salmon roe was prepared in Siberia and sold in competition with caviar, which is prepared from sturgeon eggs. The product met with favor in Europe and several Alaska firms are preparing to put it up in 1912. It should be prepared in the same manner as caviar.

Several establishments are putting up these eggs in jars and hermetically sealed cans for use as bait in sport fishing.

A product which was first made in Norway is prepared by means of an invention which quickly dries and pulverizes the flesh of fresh fish. The resulting powder, called "fish flour," is easy to transport from one place to another and has great nutritive value. It is probable that the tailpieces of the fish, which are at present thrown away, and the cheaper grades of salmon might be prepared in this way and thus furnish another market for salmon.

OIL AND FERTILIZER.

As early as 1888 there was a small plant at Astoria, Oreg., where the refuse of the canneries was utilized for the manufacture of oil and fertilizer. In that year 8,000 gallons of oil (chiefly from salmon heads), and 90 tons of fertilizer were prepared. The oil was worth 22½ cents per gallon and the fertilizer had a market value of $20 per ton. Most of the refuse was dumped into the river, however. In 1898 a similar plant was established in the Puget Sound district

of Washington, but for some reason the industry has languished almost from the start.

In 1882 the Alaska Oil & Guano Company established a fertilizer plant at Killisnoo, Alaska, for the extraction of oil and fertilizer from herring, and has operated the plant continuously ever since. In some years large quantities of whole salmon have been handled at this plant, and the resulting product was found to sell as well as that from herring.

Probably the most serious evil in the salmon industry to-day is the enormous wastage which annually occurs. About one-fourth of the total weight of each fish handled at the various packing plants is thrown away. With the exception of the tailpiece, which is discarded at most canneries owing to the excessive amount of bone which would be in the product if canned, this waste material could not be utilized as food, comprising as it does the head, viscera, fins, and tail. When not conveniently near the very few fertilizer plants at present in operation this product is either allowed to pass through chutes into the water under the cannery, or is dumped into scows and towed to the ocean or the deeper waters of the sounds, and here thrown overboard. This procedure, not only exceedingly wasteful, is also far from beneficial to the waters where deposited.

The great desideratum in the salmon fisheries of the Pacific coast at the present time is the invention of a small odorless-fertilizer plant, costing not more than $2,500 or $3,000, which can be installed at the various salmon canneries and salteries. The offal from the cannery could there be utilized and the product obtained would doubtless net a fair return on such an investment, while at the same time the present (in the aggregate) enormous waste would be stopped, and the waters adjacent to the canneries rendered far more agreeable to the fishes as well as to the people on shore. It is absolutely essential that the plant shall be odorless, as the smell of the ordinary fertilizer establishment would be very offensive to persons visiting the cannery and would not enhance the demand for canned salmon. At the present time the cheapest plant available costs about $10,000, and very few canneries can afford to invest this sum of money in the disposal of their own offal alone.

VII. STATISTICS OF THE PACIFIC SALMON INDUSTRY IN 1909.

This is the first report in which detailed statistics of the salmon fisheries of Washington, Oregon, California, and Alaska have been shown for the same year. Partial statistics of British Columbia and Yukon Territory of the Dominion of Canada are also included.

PERSONS EMPLOYED.

The large army of 28,945 men, women, and children were employed in the salmon fisheries of Alaska and the three coast States. Alaska leads with 11,433, followed by Washington, Oregon, and California in the order named. Over two-thirds of the grand total is made up of whites. The Chinese and Japanese have almost the same number, while 2,803 Indians were employed.

PERSONS ENGAGED IN THE SALMON FISHERIES OF THE PACIFIC COAST STATES AND ALASKA IN 1909.

Occupation and race.	Alaska.	Washington.	Oregon.	California.	Total.
Fishermen:					
Whites	2,486	4,426	4,179	2,114	13,205
Indians	1,176	221			1,397
Chinese				15	15
Japanese	13			168	181
Total	3,675	4,647	4,179	2,297	14,798
Shoresmen:					
Whites	1,911	2,091	404	276	4,682
Indians	1,246	115		15	1,376
Chinese	1,992	1,270	411		3,673
Japanese	2,136	1,102	256	5	3,499
Total	7,285	4,578	1,071	296	13,230
Transporters:					
Whites	443	292	70	82	887
Indians	30				30
Total	473	292	70	82	917
Total:					
Whites	4,840	6,809	4,653	2,472	18,774
Indians	2,452	336		15	2,803
Chinese	1,992	1,270	411	15	3,688
Japanese	2,149	1,102	256	173	3,680
Grand total	11,433	9,517	5,320	2,675	28,945

INVESTMENT.

The total investment in the salmon fisheries was $25,157,813, of which Alaska furnishes more than one-half. Gill nets are the principal form of apparatus in use, followed by stationary traps, or pounds, diver nets, haul seines, purse seines, etc.

INVESTMENT IN THE SALMON FISHERIES OF THE PACIFIC COAST STATES AND ALASKA IN 1909.

Items.	Alaska.		Washington.		Oregon.	
	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:						
Power vessels	133	$1,067,944	93	$440,500	30	$119,900
Tonnage	5,891		1,158		288	
Outfit		266,986		135,625		25,350
Sailing vessels	43	1,085,400				
Tonnage	59,761					
Outfit		108,540				
Power boats	17	24,840	5	3,950	15	28,900
Fishing boats, power	60	30,000	464	472,650	287	139,600
Fishing boats, sail and row	1,821	211,671	2,244	128,945	1,890	224,545
Scows and house boats	310	171,005	398	168,673	114	45,050
Pile drivers	43	90,555	62	124,350	2	1,800
Apparatus, shore fisheries:						
Purse seines	98	27,188	101	44,150		
Haul seines	94	27,731	246	28,955	48	16,280
Gill nets, drift	1,209	111,756	1,620	168,831	2,818	523,331
Gill nets, set			1,624	37,259	1,122	27,614
Diver nets			48	10,160	418	22,375
Traps, stationary	73	130,794	525	1,324,968	21	25,750
Traps, floating	15	21,250	1	2,000		
Reef nets			9	4,500		
Wheels, stationary			13	76,000	26	313,000
Wheels, scow			3	8,500	9	22,000
Spears	20	30				
Lines, trolling		523		261		
Lines, hand						
Shore and accessory property		5,601,259		1,730,030		1,554,780
Cash capital		4,970,799		1,424,500		551,500
Total		13,948,271		6,334,807		3,641,775

Items.	California.		Total.	
	Number.	Value.	Number.	Value.
Transporting vessels:				
Power vessels	4	$37,748	260	$1,666,092
Tonnage	56		7,393	
Outfit		3,920		431,881
Sailing vessels			43	1,085,400
Tonnage			59,761	
Outfit				108,540
Power boats	41	63,300	78	120,990
Fishing boats, power	171	91,050	982	733,300
Fishing boats, sail and row	1,158	128,245	7,113	693,406
Scows and house boats	50	13,925	872	398,653
Pile drivers			107	216,705
Apparatus, shore fisheries:				
Purse seines			[a] 199	71,338
Haul seines	47	5,650	[b] 435	78,616
Gill nets, drift	1,086	167,570	[c] 6,733	971,488
Gill nets, set			[d] 2,746	64,873
Diver nets			[e] 466	32,535
Traps, stationary			619	1,481,512
Traps, floating			16	23,250
Reef nets			9	4,500
Wheels, stationary			39	389,000
Wheels, scow			12	30,500
Spears			20	30
Lines, trolling		1,149		1,933
Lines, hand		10		10
Shore and accessory property		497,393		9,383,462
Cash capital		223,000		7,169,799
Total		1,232,960		25,157,813

[a] Aggregate length of 104,570 yards.
[b] Aggregate length of 111,558 yards.
[c] Aggregate length of 2,356,847 yards.
[d] Aggregate length of 151,655 yards.
[e] Aggregate length of 65,800 yards.

PRODUCTS.

The total products amount to 365,336,482 pounds, which returned the fishermen $7,224,024. Bluebacks, sockeyes, or red salmon were most numerous in Alaska and Washington, chinooks in California, coho or silver, dog or chum, and steelhead trout in Washington, while humpbacks were taken commercially in Alaska and Washington alone, being especially numerous in Alaska.

PRODUCTS OF THE SALMON FISHERIES OF ALASKA AND THE PACIFIC COAST STATES IN 1909.

Species.	Alaska.		Washington.		Oregon.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Blueback, sockeye or red	116,014,486	$1,029,079	77,280,989	$2,835,666	844,324	$34,703
Chinook, king or spring	8,959,544	151,984	11,016,476	604,906	13,952,814	736,456
Coho, silver or white	3,526,404	41,233	21,328,466	554,157	5,184,520	127,204
Dog or chum	9,456,048	15,583	25,520,426	164,300	699,348	3,818
Humpback or pink	37,965,928	95,065	17,495,586	46,187	....	....
Steelhead trout	11,650	400	2,427,251	130,486	1,510,285	66,802
Total	175,934,060	1,333,344	155,069,194	4,335,702	22,191,291	968,983

Species.	California.		Total.	
	Pounds.	Value.	Pounds.	Value.
Blueback, sockeye or red	21,000	$689	194,160,799	$3,900,137
Chinook, king or spring	11,962,248	580,094	45,891,082	2,073,440
Coho, silver or white	145,500	4,575	30,184,890	727,169
Dog or chum	4,200	84	35,680,022	183,785
Humpback or pink	....	....	55,461,514	141,252
Steelhead trout	8,989	553	3,958,175	198,241
Total	12,141,937	585,995	365,336,482	7,224,024

NOTE.—In addition to the above, British Columbia produced 89,852,089 pounds, which returned the fishermen $1,832,573, and the Yukon Territory (Yukon River), 80,565 pounds, which returned the white fishermen $10,209.

PRODUCTS CANNED.

In order to show the total pack of the Pacific coast of the North American Continent, the pack of British Columbia has been included. The total pack reduced to a common basis of forty-eight 1-pound cans amounted to 5,392,306½ cases, valued at $25,518,669. Alaska leads in the total pack, with Washington second. Alaska also leads in the pack of sockeyes, humpbacks, and chums. Washington leads in the pack of cohoes and Oregon in the pack of chinooks and steelhead trout.

SALMON CANNED IN ALASKA, BRITISH COLUMBIA, WASHINGTON, OREGON, AND CALIFORNIA IN 1909.

Products.	Alaska.		British Columbia.		Washington.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.
Chinook, king, or spring:						
½-pound flat			360	$1,440	23,550	$98,780
1-pound flat			1,214	7,314	40,730	268,849
1-pound flat exports					606	4,242
½-pound tall			176	516		
1-pound tall	48,034	$207,624	17,613	94,110	21,426	116,593
½-pound oval						
1-pound oval			444	2,886	1,110	10,212
2-pound nominal						
Total	48,034	207,624	19,807	106,266	87,422	498,676
Coho, silver, or silverside:						
½-pound flat			2,132	5,969	34,292	94,417
1-pound flat	1,206	5,543	5,911	28,373	28,885	134,755
1-pound tall	55,350	225,486	61,520	258,400	137,008	570,030
2-pound nominal					427	2,562
Total	56,556	231,029	69,563	292,742	200,612	801,764
Chum, or dog:						
½-pound flat					1,300	1,950
1-pound flat					219	591
1-pound tall	120,712	274,110	16,573	39,775	83,664	197,932
Total	120,712	274,110	16,573	39,775	85,183	200,473
Humpback, or pink:						
1-pound flat			2,267	6,234	2,030	5,585
1-pound tall	464,873	1,114,839	27,722	66,581	368,963	896,757
Total	464,873	1,114,839	29,989	72,815	370,993	902,342
Sockeye, blueback, or red:						
½-pound flat	16,385	63,888	483,760	1,935,040	229,502	927,967
1-pound flat	85,193	236,609	314,706	1,888,236	456,712	2,746,667
½-pound tall			12,880	42,504		
1-pound tall	1,611,916	7,310,053	277,893	1,500,623	487,479	2,558,993
½-pound oval			17,650	75,013		
1-pound oval			406	2,639		
1-pound squats			8,312	49,872		
Total	1,713,494	7,610,550	1,115,607	5,493,927	1,173,693	6,233,627
Steelhead trout:						
½-pound flat					945	2,937
1-pound flat					3,794	19,422
1-pound tall					3,897	22,602
Total					8,636	44,961
Grand total	2,403,669	9,438,152	1,251,539	6,005,525	1,926,539	8,681,843

SALMON CANNED IN ALASKA, BRITISH COLUMBIA, WASHINGTON, OREGON, AND CALIFORNIA IN 1909—Continued.

Products.	Oregon.		California.		Total.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.
Chinook, king, or spring:						
½-pound flat	69,557	$289,534			93,467	$389,754
1-pound flat	54,591	396,809	5,663	$28,315	102,198	701,287
1-pound flat exports					606	4,242
½-pound tall					176	516
1-pound tall	23,057	148,815			110,130	567,142
½-pound oval	534	2,670			534	2,670
1-pound oval	848	8,242			2,402	21,340
2-pound nominal	458	1,833			458	1,833
Total	149,045	847,903	5,663	28,315	309,971	1,688,784
Coho, silver, or silverside:						
½-pound flat	20,331	56,928			56,755	157,314
1-pound flat	11,755	51,702			47,757	220,373
1-pound tall	39,326	157,886			293,204	1,211,802
2-pound nominal	315	945			742	3,507
Total	71,727	267,461			398,458	1,592,996
Chum, or dog:						
½-pound flat					1,300	1,950
1-pound flat					219	591
1-pound tall	9,225	21,218			230,174	533,035
Total	9,225	21,218			231,693	535,576
Humpback, or pink:						
1-pound flat					4,297	11,819
1-pound tall	55	132			861,613	2,078,309
Total	55	132			865,910	2,090,128
Sockeye, blueback, or red:						
½-pound flat	32,071	133,095			761,718	3,059,990
1-pound flat	6,645	39,870			863,256	4,911,382
½-pound tall					12,880	42,504
1-pound tall	50	320			2,377,338	11,369,989
½-pound oval					17,650	75,013
1-pound oval					406	2,639
1-pound squats					8,312	49,872
Total	38,766	173,285			4,041,560	19,511,389
Steelhead trout:						
½-pound flat	7,064	22,084			8,009	25,021
1-pound flat	1,365	7,695			5,159	27,117
1-pound tall	4,320	25,056			8,217	47,658
Total	12,749	54,835			21,385	99,796
Grand total	281,567	1,364,834	5,663	28,315	[a] 5,868,977	25,518,669

[a] All 1-pound cases contain forty-eight 1-pound cans; the ½-pound cases contain forty-eight ½-pound cans. Reduced to a common basis of cases containing forty-eight 1-pound cans, the aggregate pack amounts to 5,392,306½ cases.

MISCELLANEOUS PRODUCTS.

The total miscellaneous secondary products prepared amounted to 29,808,129 pounds, valued at $2,096,030. Of these the largest quantity and value is represented in the mild-cured pack. The pickled pack is second in quantity but is exceeded in value by the frozen pack. Alaska leads Washington very slightly in the quantity of products prepared, but both are exceeded in value of products by Oregon.

MISCELLANEOUS SECONDARY PRODUCTS PREPARED IN ALASKA AND THE PACIFIC COAST STATES IN 1909.

Products.	Alaska.		Washington.		Oregon.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Frozen:						
Chinook, king, or spring			74,183	$7,418	14,000	$1,400
Coho, silver, or silverside	35,721	$1,072	528,477	30,149	216,175	13,868
Dog, or chum	77,882	1,558	1,364,672	67,161		
Humpback, or pink			62,945	1,888		
Steelhead trout	9,450	473	504,165	46,615	1,446,685	144,658
Total	123,053	3,103	2,534,442	153,231	1,676,860	159,926
Mild-cured:						
Chinook, king, or spring	1,833,600	149,300	2,292,800	273,826	4,365,442	434,825
Pickled:						
Chinook, king, or spring	88,200	3,798	1,000	540	400	24
Chinook bellies	7,000	175	6,750	671		
Coho, silver, or silverside	63,600	2,485			2,600	130
Coho bellies	227,750	3,843				
Dog, or chum	7,000	190	50,000	175		
Humpback, or pink	311,400	9,405	1,615,000	48,450		
Humpback backs	11,200	224				
Humpback bellies	169,480	7,396	172,400	8,620		
Sockeye, blueback, or red	5,301,500	167,298				
Sockeye bellies	783,600	13.902				
Total	6.970,730	208,716	1,845,150	58,456	3,000	154
Dry-salted and dried:						
Chinook, king, or spring	800	45				
Coho, silver, or silverside, backs	14,500	549				
Dog, or chum	71,600	1,038				
Humpback backs	51,500	545				
Sockeye, blueback, or red, backs	83,000	2,302				
Total	221,400	4,479				
Smoked:						
Chinook, king, or spring			30,165	2,413	127,700	19,155
Chinook, white-meated, kippered			190,500	16,050		
Coho, silver, or silverside			30,000	1,800	20,000	2,000
Coho backs	4,000	400				
Dog, or chum	585	43	517,245	25,862		
Dog, kippered			5,000	500		
Humpback backs, kippered			100,000	5,000		
Sockeye, blueback, or red, backs	40,300	2,780				
Total	44,885	3,223	872,910	51,625	147,700	21,155
Fertilizer	159,224	2,287	1,210,000	18,610		
Oil	120,113	3,216	380,648	14,161		
Grand total	9,473,005	374,324	9,135,950	569,909	6,193,002	616,060

MISCELLANEOUS SECONDARY PRODUCTS PREPARED IN ALASKA AND THE PACIFIC COAST STATES IN 1909—Continued.

Products.	California.		Total.	
	Pounds.	Value.	Pounds.	Value.
Frozen:				
Chinook, king, or spring			88,183	$8,818
Coho, silver, or silverside			780,373	45,089
Dog, or chum			1,442,554	68,719
Humpback, or pink			62,945	1,888
Steelhead trout			1,960,300	191,746
Total			4,334,355	316,260
Mild-cured:				
Chinook, king, or spring	4,887,962	$520,468	13,379,804	1,378,419
Pickled:				
Chinook, king, or spring			89,600	4,362
Chinook bellies			13,750	846
Coho, silver, or silverside			66,200	2,615
Coho bellies			227,750	3,843
Dog, or chum			57,000	365
Humpback, or pink			1,926,400	57,855
Humpback backs			11,200	224
Humpback bellies			341,880	16,016
Sockeye, blueback, or red			5,301,500	167,298
Sockeye bellies			783,600	13,902
Total			8,818,880	267,326
Dry-salted and dried:				
Chinook, king, or spring			800	45
Coho, silver, or silverside backs			14,500	549
Dog, or chum			71,600	1,038
Humpback backs			51,500	545
Sockeye, blueback, or red, backs			83,000	2,302
Total			221,400	4,479
Smoked:				
Chinook, king, or spring	110,550	14,643	268,415	36,211
Chinook, white-meated, kippered			190,500	16,050
Coho, silver or silverside	7,660	626	57,660	4,426
Coho backs			4,000	400
Dog, or chum			517,830	25,905
Dog, kippered			5,000	500
Humpback backs, kippered			100,000	5,000
Sockeye, blueback, or red, backs			40,300	2,780
Total	118,210	15,269	1,183,705	91,272
Fertilizer			1,369,224	20,897
Oil			[a] 500,761	17,377
Grand total	5,006,172	535,737	29,808,129	2,096,030

[a] Represents 66,728 gallons.

WASHINGTON.

Owing to the quadrennially heavy run of sockeye salmon and the biennial run of humpback salmon into Puget Sound occurring in 1909, the catch of both species of salmon was very heavy. The purse seiners made exceptionally heavy catches of sockeye salmon, while the traps had so many humpbacks in them that the greater part were turned out, it being impossible to find a market for them. In many places people were allowed to take away with them, free of charge, as many humpbacks as they wished.

In Grays Harbor the run of salmon was fairly good. On the Quiniault River the Indians made very successful catches. Early in the season a meeting of the tribe was held, and it was decided that a

50-foot runway in the center of the stream should be kept clear of nets so as to allow the fish an opportunity to reach the spawning beds in the lake.

In Willapa Harbor the run was fair.

On the Columbia River the catch was not as large as in 1908, which was due partly to the shortening of the open fishing season.

STATISTICS BY COUNTIES.

Persons employed.—The total number of persons employed was 9,517, of which the large majority were whites.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF WASHINGTON, BY COUNTIES AND NATIONALITIES, IN 1909.

Counties.	Fishermen.			Shoresmen.				
	Whites.	Indians.	Total.	Whites.	Chinese.	Japanese.	Indians.	Total.
Whatcom	643		643	1,056	631	488	55	2,230
San Juan	193	12	205	42	40	40		122
Skagit	303		303	569	290	414	40	1,313
Island	273		273	2				2
Snohomish	284		284	6				6
King	527		527	55				55
Pierce	276		276	12				12
Thurston	50		50					
Mason	67		67					
Kitsap	241		241					
Clallam	56	176	232	63	20	12		95
Jefferson	68		68	163	70	50	20	303
Chehalis	112	33	145	16	45	15		76
Pacific	616		616	18	40	20		78
Wahkiakum	533		533	80	134	63		277
Cowlitz	61		61	6				6
Clarke	13		13					
Skamania	82		82	2				2
Klickitat	28		28	1				1
Total	4,426	221	4,647	2,091	1,270	1,102	115	4,578

Counties.	Transporters.	Total employed.				Grand total.
	Whites.	Whites.	Chinese.	Japanese.	Indians.	
Whatcom	129	1,828	631	488	55	3,002
San Juan	9	244	40	40	12	336
Skagit	75	947	290	414	40	1,691
Island		275				275
Snohomish		290				290
King	19	601				601
Pierce	2	290				290
Thurston		50				50
Mason		67				67
Kitsap		241				241
Clallam	6	125	20	12	176	333
Jefferson	12	243	70	50	20	383
Chehalis	3	131	45	15	33	224
Pacific	11	645	40	20		705
Wahkiakum	25	638	134	63		835
Cowlitz	1	68				68
Clarke		13				13
Skamania		84				84
Klickitat		29				29
Total	292	6,809	1,270	1,102	336	9,517

Investment, apparatus, etc.—The total investment in the fisheries amounted to $6,334,807. Whatcom County has the largest investment, nearly one-third of the total.

INVESTMENT IN THE SALMON FISHERIES OF WASHINGTON, BY COUNTIES, IN 1909.

Items.	Whatcom.		San Juan.		Skagit.		Island.		Snohomish.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	36	$192,500	3	$15,500	18	$108,900				
Tonnage	517		48		293					
Outfit		60,500		4,600		32,400				
Fishing boats, power	40	59,850	8	21,250	43	37,250	22	$13,900	26	$16,400
Fishing boats, sail and row	247	8,210	73	3,190	207	7,410	85	3,210	203	6,380
Scows and house boats	188	101,350	47	15,833	31	9,150	63	18,200	17	3,800
Pile drivers	13	61,000	5	23,600			2	9,000		
Apparatus, shore fisheries:										
Purse seines	9	3,900	7	2,550	4	1,500	1	500	4	1,000
Haul seines	9	1,100			17	1,285	27	2,010	20	3,005
Gill nets, drift	71	12,250	3	225	338	26,270	1	300	130	1,036
Gill nets, set	96	6,200	18	310	336	5,700	1	10	537	6,317
Trap nets, stationary	72	372,540	23	116,178	12	46,500	29	176,500	8	35,000
Reef nets	2	1,000	7	3,500						
Lines, trolling										15
Shore and accessory property		600,003		37,350		382,044		5,250		6,245
Cash capital		679,000		45,000		309,000				
Total		2,159,403		289,086		967,409		228,880		79,198

Items.	King.		Pierce.		Thurston.		Mason.		Kitsap.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	7	$23,300	1	$2,500						
Tonnage	56		5							
Outfit		11,400		800						
Power boats			1	200						
Fishing boats, power	60	107,900	23	60,200	1	$2,500	4	$3,800	26	$36,900
Fishing boats, sail and row	234	7,350	88	3,300	27	880	29	1,310	85	3,055
Scows and house boats									6	850
Pile drivers									1	2,000
Apparatus, shore fisheries:										
Purse seines	37	18,500	22	8,500	2	1,000	1	500	12	5,700
Haul seines	52	4,650	25	1,950	8	600	13	1,025	36	2,930
Gill nets, drift	193	8,760	73	1,900	4	100	1	300	7	1,950
Gill nets, set	82	820	143	3,600	16	400	22	600	8	88
Trap nets, stationary									4	13,500
Shore and accessory property		166,800		15,375		200		300		850
Cash capital		60,000		5,000						
Total		409,480		103,325		5,680		7,835		67,823

INVESTMENT IN THE SALMON FISHERIES OF WASHINGTON, BY COUNTIES, IN 1909—Continued.

Items.	Clallam.		Jefferson.		Chehalis.		Pacific.		Wahkiakum.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	3	$12,000	4	$29,000	1	$3,000	6	$16,700	13	$36,100
Tonnage	27		50		8		48		101	
Outfit		4,000		6,100		500		4,315		10,660
Power boats	1	1,500					2	1,800	1	450
Fishing boats, power	2	1,600	5	2,200	5	2,500	88	46,800	72	43,500
Fishing boats, sail and row	212	9,580	29	940	115	8,350	317	22,820	191	38,735
Scows and house boats	2	1,000	16	5,050	1	400	9	3,300	16	8,990
Pile drivers			1	5,000	3	450	37	23,300		
Apparatus, shore fisheries:										
Purse seines							2	500		
Haul seines	8	900	11	800			2	350	11	5,500
Gill nets, drift	70	700	5	340	100	8,000	207	36,000	417	70,700
Gill nets, set	8	100	25	430	189	9,724	46	1,340	33	615
Trap nets, stationary			2	8,000	15	3,400	280	506,400	52	36,800
Trap nets, floating			1	2,000						
Lines, trolling		246								
Shore and accessory property		20,325		60,345		36,753		59,625		310,455
Cash capital		20,000		50,000		20,000		38,000		190,500
Total		71,951		170,205		93,077		761,250		753,005

Items.	Cowlitz.		Clarke.		Skamania.		Klickitat.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	1	$1,000							93	$440,500
Tonnage	5								1,158	
Outfit		350								135,625
Power boats									5	3,950
Fishing boats, power	28	11,700	1	$400	10	$4,000			464	472,650
Fishing boats, sail and row	29	1,200	12	360	46	1,945	15	$720	2,244	128,945
Scows and house boats					2	750			398	168,673
Pile drivers									62	124,350
Apparatus, shore fisheries:										
Purse seines									[a] 101	44,150
Haul seines	1	150			4	1,500	2	1,200	[b] 246	28,955
Gill nets, drift									[c] 1,620	168,831
Gill nets, set	18	350	12	180	32	455	2	20	[d] 1,624	37,259
Diver nets	29	5,300	6	1,210	13	3,650			[e] 48	10,160
Trap nets, stationary	21	8,400			3	750	4	1,000	525	1,324,968
Trap nets, floating									1	2,000
Reef nets									9	4,500
Wheels, stationary					10	44,000	3	32,000	13	76,000
Wheels, scow					2	7,000	1	1,500	3	8,500
Lines, trolling										261
Shore and accessory property		21,800		10		5,075		1,225		1,730,030
Cash capital		8,000								1,424,500
Total		58,250		2,160		69,125		37,665		6,334,807

[a] Aggregate length of 68,900 yards.
[b] Aggregate length of 44,824 yards.
[c] Aggregate length of 429,115 yards.
[d] Aggregate length of 92,030 yards.
[e] Aggregate length of 19,200 yards.

Products.—The total catch amounted to 155,069,194 pounds, valued at $4,335,702. Whatcom County leads in the catch. Sockeye salmon constitute about one-half of the total catch.

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909.

Apparatus and species.	Whatcom.		San Juan.		Skagit.		Island.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
PURSE SEINES.								
Chinook, or king	37,568	$1,514	24,094	$840	12,000	$540	2,000	$100
Coho, or silver	346,000	8,880	280,008	7,000	200,000	5,000	42,000	1,050
Dog, or chum	496,000	2,480	280,000	1,400	160,000	800	112,000	560
Humpback, or pink	...	...	175,000	350	30,000	300	...	...
Sockeye, or blueback	1,146,000	43,600	973,000	35,000	650,000	26,000	140,000	5,666
Steelhead trout	...	...	...	...	2,000	100	800	40
Total	2,025,568	56,474	1,732,102	44,590	1,054,000	32,740	296,800	7,416
HAUL SEINES.								
Chinook, or king	...	...	...	...	154,400	7,060	...	...
Coho, or silver	21,000	630	...	...	110,000	2,750	560,000	16,800
Dog, or chum	39,000	195	...	...	590,000	2,950	1,280,000	7,710
Humpback, or pink	14,000	35	...	...	20,000	50	...	...
Steelhead trout	7,000	350	...	...	2,428	121	...	...
Total	81,000	1,210	...	...	876,828	12,931	1,840,000	24,510
GILL NETS.								
Chinook, or king	22,332	967	47,300	1,880	617,362	25,753	...	...
Coho, or silver	1,122,000	29,200	79,200	1,980	662,376	20,873	1,500	45
Dog, or chum	70,000	350	4,800	24	673,838	3,573	3,000	30
Humpback, or pink	...	...	...	...	17,800	221	...	...
Sockeye, or blueback	1,328,450	51,158	44,500	1,780	384,750	12,510	30,000	1,200
Steelhead trout	...	...	...	...	124,200	8,004	...	...
Total	2,542,782	81,675	175,800	5,664	2,480,326	70,934	34,500	1,275
REEF NETS.								
Chinook, or king	5,000	250	40,000	2,000	...	...	...	...
Coho, or silver	27,000	810	109,000	3,270	...	...	...	...
Dog, or chum	6,000	50	90,000	450	...	...	...	...
Sockeye, or blueback	75,000	3,000	290,000	11,600	...	...	...	...
Total	113,000	4,110	529,000	17,320	...	...	...	...
TRAP NETS.								
Chinook, or king	1,378,391	66,229	574,072	25,697	354,929	18,270	1,272,680	111,735
Coho, or silver	3,387,624	73,940	718,124	17,967	482,116	12,271	1,615,314	42,876
Dog, or chum	570,412	2,852	229,408	1,148	1,227,536	6,457	857,760	4,789
Humpback, or pink	8,440,850	21,102	4,205,320	11,585	1,613,188	4,179	2,381,428	5,954
Sockeye, or blueback	41,032,910	1,558,804	7,665,005	187,312	2,881,185	108,398	4,574,145	168,468
Steelhead trout	...	...	272	13	4,000	260	45,310	2,266
Total	54,810,187	1,722,927	13,392,201	243,722	6,562,954	149,835	10,746,637	336,088
TOTAL.								
Chinook, or king	1,443,291	68,960	685,466	30,417	1,138,691	51,623	1,274,680	111,835
Coho, or silver	4,903,624	113,460	1,186,332	30,217	1,454,492	40,894	2,218,814	60,771
Dog, or chum	1,181,412	5,927	604,208	3,022	2,651,374	13,780	2,252,760	13,089
Humpback, or pink	8,454,850	21,137	4,380,320	11,935	1,680,988	4,750	2,381,428	5,954
Blueback, or sockeye	43,582,360	1,656,562	8,972,505	235,692	3,915,935	146,908	4,744,145	175,334
Steelhead trout	7,000	350	272	13	132,628	8,485	46,110	2,306
Grand total	59,572,537	1,866,396	15,829,103	311,296	10,974,108	266,440	12,917,937	369,289

Products of the Salmon Fisheries of Washington, by Apparatus, Species, and Counties, in 1909—Continued.

Apparatus and species.	Snohomish.		King.		Pierce.		Thurston.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
PURSE SEINES.								
Chinook, or king	8,000	$400	....	....	82,285	$4,400	1,250	$50
Coho, or silver	159,998	4,400	766,000	$21,175	513,340	13,833	54,396	1,510
Dog, or chum	350,000	1,700	1,640,000	14,500	2,482,000	12,410	570,000	3,600
Sockeye, or blueback	800,000	28,800	7,050,000	282,000	4,394,995	158,220	125,000	5,000
Steelhead trout	....	....	14,100	987	10,400	520	400	20
Total	1,317,998	35,300	9,470,100	318,662	7,483,020	189,383	751,046	10,180
HAUL SEINES.								
Chinook, or king	....	....	65,500	4,585	18,743	1,312	....	....
Coho, or silver	155,250	3,125	364,000	11,000	462,000	13,000	60,000	2,000
Dog, or chum	399,000	1,995	808,000	10,100	1,293,000	8,750	340,000	6,800
Humpback, or pink	202,000	503	....	....	....	....	....	....
Total	756,250	5,623	1,237,500	25,685	1,773,743	23,062	400,000	8,800
GILL NETS.								
Chinook, or king	337,900	12,164	49,500	3,960	30,000	2,400	....	....
Coho, or silver	438,256	16,480	555,000	18,500	246,000	10,250	90,000	3,000
Dog, or chum	101,380	731	70,400	440	32,000	200	48,000	240
Humpback, or pink	....	....	42,000	525	....	....	....	....
Sockeye, or blueback	....	....	335,500	13,420	....	....	....	....
Steelhead trout	142,243	9,293	205,000	12,300	100,000	10,000	30,000	1,500
Total	1,019,779	38,668	1,257,400	49,145	408,000	22,850	168,000	4,740
TRAP NETS.								
Chinook, or king	385,150	16,716	....	....	....	....	....	....
Coho, or silver	908,764	23,167	....	....	....	....	....	....
Dog, or chum	813,200	4,066	....	....	....	....	....	....
Humpback, or pink	354,000	1,383	....	....	....	....	....	....
Steelhead trout	27,000	1,350	....	....	....	....	....	....
Total	2,488,114	46,682	....	....	....	....	....	....
LINES.								
Coho, or silver	281,250	7,500	....	....	....	....	....	....
TOTAL.								
Chinook, or king	731,050	29,280	115,000	8,545	131,028	8,112	1,250	50
Coho, or silver	1,943,518	54,672	1,685,000	50,675	1,221,340	37,083	204,396	6,510
Dog, or chum	1,663,580	8,492	2,518,400	25,040	3,807,000	21,360	958,000	10,640
Humpback, or pink	556,000	1,886	42,000	525	....	....	....	....
Blueback, or sockeye	800,000	28,800	7,385,500	295,420	4,394,995	158,220	125,000	5,000
Steelhead trout	169,243	10,643	219,100	13,287	110,400	10,520	30,400	1,520
Grand total	5,863,391	133,773	11,965,000	393,492	9,664,763	235.295	1,319,046	23,720

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

Apparatus and species.	Mason.		Kitsap.		Clallam.		Jefferson.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
PURSE SEINES.								
Chinook, or king			40,000	$2,000				
Coho, or silver	108,000	$2,700	613,990	15,350				
Dog, or chum	400,000	2,000	2,540,000	13,700				
Sockeye, or blueback	100,000	4,000	2,045,000	81,800				
Steelhead trout	600	42	4,900	245				
Total	608,600	8,742	5,243,890	113,095				
HAUL SEINES.								
Chinook, or king			12,000	600	31,000	$1,550	21,000	$1,050
Coho, or silver	437,998	11,480	378,000	9,990	110,000	3,300	122,000	3,760
Dog, or chum	756,000	4,370	1,129,000	8,970	39,000	330	227,600	2,488
Sockeye, or blueback							8,000	400
Steelhead trout	3,000	210	17,080	854	14,200	710	5,200	260
Total	1,196,998	16,060	1,536,080	20,414	194,200	5,890	383,800	7,958
GILL NETS.								
Chinook, or king					75,000	3,750	17,000	970
Coho, or silver	40,000	1,200	18,000	490	60,515	1,578	74,000	2,220
Dog, or chum	81,000	640	33,000	395	30,000	150	48,000	240
Sockeye, or blueback	25,000	1,000	154,000	6,140			24,500	980
Steelhead trout	4,000	240	2,300	115	33,055	1,653	7,000	350
Total	150,000	3,080	207,300	7,140	198,570	7,131	170,500	4,760
TRAP NETS.								
Chinook, or king			106,225	5,305			4,282	199
Coho, or silver			504,074	13,020			265,662	6,642
Dog, or chum			1,333,704	6,669			1,036,472	5,182
Steelhead trout							1,735	87
Total			1,944,003	24,994			1,308,151	12,110
LINES.								
Chinook, or king					110,880	4,800		
Coho, or silver					571,284	17,649		
Dog, or chum					4,000	20		
Total					686,164	22,469		
TOTAL.								
Chinook, or king			158,225	7,905	216,880	10,100	42,282	2,219
Coho, or silver	585,998	15,380	1,514,064	38,850	741,799	22,527	461,662	12,622
Dog, or chum	1,237,000	7,010	5,035,704	29,734	73,000	500	1,312,072	7,910
Blueback, or sockeye	125,000	5,000	2,199,000	87,940			32,500	1,380
Steelhead trout	7,600	492	24,280	1,214	47,255	2,363	13,935	697
Grand total	1,955,598	27,882	8,931,273	165,643	1,078,934	35,490	1,862,451	24,828

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

Apparatus and species.	Chehalis.		Pacific.		Wahkiakum.		Cowlitz.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
PURSE SEINES.								
Chinook, or king			8,919	$535				
Coho, or silver			2,184	44				
Sockeye, or blueback			1,090	49				
Steelhead trout			4,742	190				
Total			16,935	818				
HAUL SEINES.								
Chinook, or king			11,500	345	312,616	$18,957	50,000	$3,000
Coho, or silver					42,417	848		
Sockeye, or blueback					19,722	888	12,000	600
Steelhead trout					112,221	5,411	28,000	1,400
Total			11,500	345	486,976	26,104	90,000	5,000
GILL NETS.								
Chinook, or king	571,586	$15,840	813,978	47,253	1,100,511	66,031		
Coho, or silver	641,858	16,571	187,000	5,500	316,274	6,325		
Dog, or chum	306,256	1,889	57,800	432	400,224	2,354		
Sockeye, or blueback	638,000	23,200	4,500	203				
Steelhead trout	118,000	4,066	45,142	2,328	139,877	6,994	13,000	620
Total	2,275,700	61,566	1,108,420	55,716	1,956,886	81,704	13,000	620
DIVER NETS.								
Chinook, or king							172,667	10,820
Steelhead trout							76,533	3,827
Total							249,200	14,647
TRAP NETS.								
Chinook, or king	49,000	1,113	1,208,963	67,996	31,669	492	69,690	303
Coho, or silver	165,000	3,875	620,461	9,649	458,571	9,172	203,000	4,290
Dog, or chum	36,000	225	725,652	8,996	634,384	3,490	65,600	410
Sockeye, or blueback			113,195	5,093				
Steelhead trout			431,615	21,779	32,416	1,621	6,800	290
Total	250,000	5,213	3,099,886	113,513	1,157,040	14,775	345,090	5,293
TOTAL.								
Chinook, or king	620,586	16,953	2,043,360	116,129	1,444,796	85,480	292,357	14,123
Coho, or silver	806,858	20,446	809,645	15,193	817,262	16,345	203,000	4,290
Dog, or chum	342,256	2,114	783,452	9,428	1,034,608	5,844	65,600	410
Blueback, or sockeye	638,000	23,200	118,785	5,345	19,722	888	12,000	600
Steelhead trout	118,000	4,066	481,499	24,297	284,514	14,026	124,333	6,137
Grand total	2,525,700	66,779	4,236,741	170,392	3,600,902	122,583	697,290	25,560

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

Apparatus and species.	Clarke.		Skamania.		Klickitat.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
PURSE SEINES.								
Chinook, or king							216,116	$10,379
Coho, or silver							3,085,916	80,942
Dog, or chum							9,030,000	53,150
Humpback, or pink							205,000	650
Sockeye, or blueback							17,425,085	670,135
Steelhead trout							37,942	2,144
Total							30,000,059	817,400
HAUL SEINES.								
Chinook, or king			180,000	$12,600			856,759	51,059
Coho, or silver					200,000	$6,000	3,022,665	84,683
Dog, or chum							6,900,600	54,658
Humpback, or pink							236,000	588
Sockeye, or blueback			24,000	1,200			63,722	3,088
Steelhead trout			18,000	900	300,480	15,024	507,609	25,240
Total			222,000	14,700	500,480	21,024	11,587,355	219,316
GILL NETS.								
Chinook, or king	3,000	$210	15,944	1,115	800	50	3,702,213	182,343
Coho, or silver	8,015	244	6,216	186	1,000	30	4,547,210	134,672
Dog, or chum							1,959,698	11,688
Humpback, or pink							59,800	746
Sockeye, or blueback			2,850	143			2,972,050	111,734
Steelhead trout	9,700	485	9,150	458	600	36	983,267	58,442
Total	20,715	939	34,160	1,902	2,400	116	14,224,238	499,625
DIVER NETS.								
Chinook, or king	14,000	980	77,614	5,433			264,281	17,233
Coho, or silver			2,000	60			2,000	60
Steelhead trout	3,000	150	3,000	150			82,533	4,127
Total	17,000	1,130	82,614	5,643			348,814	21,420
REEF NETS.								
Chinook, or king							45,000	2,250
Coho, or silver							136,000	4,080
Dog, or chum							96,000	500
Sockeye, or blueback							365,000	14,600
Total							642,000	21,430
TRAP NETS.								
Chinook, or king			4,200	294	14,600	1,022	5,453,851	315,371
Coho, or silver			3,000	90	17,600	528	9,349,310	217,487
Dog, or chum							7,530,128	44,284
Humpback, or pink							16,994,786	44,203
Sockeye, or blueback			800	40	2,250	128	56,269,490	2,023,243
Steelhead trout			3,600	180	6,600	366	559,348	28,212
Total			11,600	604	41,050	2,044	96,156,913	2,677,800
WHEELS.								
Chinook, or king			261,736	16,039	105,640	5,432	367,376	21,471
Coho, or silver			18,751	666	314,080	6,418	332,831	7,084
Sockeye, or blueback			173,842	7,358	11,800	508	185,642	7,866
Steelhead trout			52,552	2,081	204,000	10,240	256,552	12,321
Total			506,881	26,144	635,520	22,598	1,142,401	48,742
LINES.								
Chinook, or king							110,880	4,800
Coho, or silver							852,534	25,149
Dog, or chum							4,000	20
Total							967,414	29,969

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

Apparatus and species.	Clarke.		Skamania.		Klickitat.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
TOTAL.								
Chinook, or king	17,000	$1,190	539,494	$35,481	121,040	$6,504	11,016,476	$604,906
Coho, or silver	8,015	244	29,967	1,002	532,680	12,976	21,328,466	554,157
Dog, or chum							25,520,426	164,300
Humpback, or pink							17,495,586	46,187
Blueback, or sockeye			201,492	8,741	14,050	636	77,280,989	2,835,666
Steelhead trout	12,700	635	86,302	3,769	511,680	25,666	2,427,251	130,486
Grand total	37,715	2,069	857,255	48,993	1,179,450	45,782	155,069,194	4,335,702

STATISTICS BY WATERS.

Persons employed.—Puget Sound leads in the number of persons employed in all branches of the industry, followed by Columbia River, Grays Harbor, and Willapa Harbor in the order named.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF WASHINGTON, BY WATERS AND NATIONALITIES, IN 1909.

Occupation and race.	Puget Sound.	Grays Harbor.	Willapa Harbor.	Columbia River.	Total.
Fishermen:					
Whites	2,981	112	130	1,203	4,426
Indians	188	33			221
Total	3,169	145	130	1,203	4,647
Shoresmen:					
Whites	1,968	16	10	97	2,091
Indians	115				115
Chinese	1,051	45	10	164	1,270
Japanese	1,004	15	10	73	1,102
Total	4,138	76	30	334	4,578
Transporters:					
Whites	252	3	4	33	292
Total:					
Whites	5,201	131	144	1,333	6,809
Indians	303	33			336
Chinese	1,051	45	10	164	1,270
Japanese	1,004	15	10	73	1,102
Grand total	7,559	224	164	1,570	9,517

Investment, apparatus, etc.—Puget Sound leads in the total investment. The principal forms of apparatus used in the waters of Washington are gill nets, haul and purse seines, traps, and wheels.

INVESTMENT IN THE SALMON FISHERIES OF WASHINGTON, BY WATERS, IN 1909.

Items.	Puget Sound.		Grays Harbor.		Willapa Harbor.		Columbia River.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	72	$383,700	1	$3,000	2	$8,500	18	$45,300	93	$440,500
Tonnage	996		8		19		135		1,158	
Outfit		119,860		500		2,190		13,075		135,625
Power boats	2	1,700					3	2,250	5	3,950
Fishing boats, power	260	363,750	5	2,500	24	7,800	175	98,600	464	472,650
Fishing boats, sail and row	1,519	54,815	115	8,350	48	6,340	562	59,440	2,244	128,945
Scows and house boats	370	155,233	1	400	8	2,800	19	10,240	398	168,673
Pile drivers	22	100,600	3	450	2	1,800	35	21,500	62	124,350
Apparatus, shore fisheries:										
Purse seines	[a] 99	43,650					[b] 2	500	101	44,150
Haul seines	[c] 226	20,255			[d] 2	350	[e] 18	8,350	246	28,955
Gill nets, drift	[f] 896	54,131	[g] 100	8,000	[h] 80	5,600	[i] 544	101,100	1,620	168,831
Gill nets, set	[j] 1,292	24,575	[k] 189	9,724	[l] 12	360	[m] 131	2,600	1,624	37,259
Diver nets							[n] 48	10,160	48	10,160
Trap nets, stationary	150	768,218	15	3,400	35	16,400	325	536,950	525	1,324,968
Trap nets, floating	1	2,000							1	2,000
Reef nets	9	4,500							9	4,500
Wheels, stationary							13	76,000	13	76,000
Wheels, scow							3	8,500	3	8,500
Lines, trolling		261								261
Shore and accessory property		1,295,087		36,753		50,000		348,190		1,730,030
Cash capital		1,168,000		20,000		18,000		218,500		1,424,500
Total		4,560,335		93,077		120,140		1,561,255		6,334,807

[a] Aggregate length of 68,100 yards.
[b] Aggregate length of 800 yards.
[c] Aggregate length of 35,841 yards.
[d] Aggregate length of 300 yards.
[e] Aggregate length of 8,683 yards.
[f] Aggregate length of 112,915 yards.
[g] Aggregate length of 20,000 yards.
[h] Aggregate length of 28,000 yards.
[i] Aggregate length of 268,200 yards.
[j] Aggregate length of 57,980 yards.
[k] Aggregate length of 27,960 yards.
[l] Aggregate length of 720 yards.
[m] Aggregate length of 5,370 yards.
[n] Aggregate length of 19,200 yards.

Products.—The total catch amounted to 155,069,194 pounds, valued at $4,335,702, of which Puget Sound produced 141,934,141 pounds, valued at $3,853,544. Trap nets were the most effective. No humpbacks were taken commercially elsewhere than in Puget Sound, while no sockeyes or bluebacks were taken commercially in Willapa Harbor.

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND WATERS, IN 1909.

Apparatus and species.	Puget Sound.		Grays Harbor.		Willapa Harbor.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
PURSE SEINES.						
Chinook, or king	207,197	$9,844				
Coho, or silver	3,083,732	80,898				
Dog, or chum	9,030,000	53,150				
Humpback, or pink	205,000	650				
Sockeye, or blueback	17,423,995	670,086				
Steelhead trout	33,200	1,954				
Total	29,983,124	816,582				
HAUL SEINES.						
Chinook, or king	302,643	16,157			11,500	$345
Coho, or silver	2,780,248	77,835				
Dog, or chum	6,900,600	54,658				
Humpback, or pink	236,000	588				
Sockeye, or blueback	8,000	400				
Steelhead trout	48,908	2,505				
Total	10,276,399	152,143			11,500	345
GILL NETS.						
Chinook, or king	1,196,394	51,844	571,586	$15,840	40,000	1,200
Coho, or silver	3,386,847	105,816	641,858	16,571	22,000	2,200
Dog, or chum	1,195,418	7,013	306,256	1,889	9,800	162
Humpback, or pink	59,800	746				
Sockeye, or blueback	2,326,700	88,188	638,000	23,200		
Steelhead trout	647,798	43,455	118,000	4,066	16,000	800
Total	8,812,957	297,062	2,275,700	61,566	87,800	4,362
REEF NETS.						
Chinook, or king	45,000	2,250				
Coho, or silver	136,000	4,080				
Dog, or chum	96,000	500				
Sockeye, or blueback	365,000	14,600				
Total	642,000	21,430				
TRAP NETS.						
Chinook, or king	4,075,729	244,151	49,000	1,113	187,799	6,890
Coho, or silver	7,881,678	189,883	165,000	3,875	262,271	2,485
Dog, or chum	6,068,492	31,163	36,000	225	643,332	8,482
Humpback, or pink	16,994,786	44,203				
Sockeye, or blueback	56,153,245	2,022,982				
Steelhead trout	78,317	3,976			170	7
Total	91,252,247	2,536,358	250,000	5,213	1,093,572	17,864
LINES.						
Chinook, or king	110,880	4,800				
Coho, or silver	852,534	25,149				
Dog, or chum	4,000	20				
Total	967,414	29,969				
TOTAL.						
Chinook, or king	5,937,843	329,046	620,586	16,953	239,299	8,435
Coho, or silver	18,121,039	483,661	806,858	20,446	284,271	4,685
Dog, or chum	23,294,510	146,504	342,256	2,114	653,132	8,644
Humpback, or pink	17,495,586	46,187				
Sockeye, or blueback	76,276,940	2,796,256	638,000	23,200		
Steelhead trout	808,223	51,890	118,000	4,066	16,170	807
Grand total	141,934,141	3,853,544	2,525,700	66,779	1,192,872	22,571

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

Apparatus and species.	Columbia River.		Total.	
	Pounds.	Value.	Pounds.	Value.
PURSE SEINES.				
Chinook, or king	8,919	$535	216,116	$10,379
Coho, or silver	2,184	44	3,085,916	80,942
Dog, or chum			9,030,000	53,150
Humpback, or pink			205,000	650
Sockeye, or blueback	1,090	49	17,425,085	670,135
Steelhead trout	4,742	190	37,942	2,144
Total	16,935	818	30,000,059	817,400
HAUL SEINES.				
Chinook, or king	542,616	34,557	856,759	51,059
Coho, or silver	242,417	6,848	3,022,665	84,683
Dog, or chum			6,900,600	54,658
Humpback, or pink			236,000	588
Sockeye, or blueback	55,722	2,688	63,722	3,088
Steelhead trout	458,701	22,735	507,609	25,240
Total	1,299,456	66,828	11,587,355	219,316
GILL NETS.				
Chinook, or king	1,894,233	113,459	3,702,213	182,343
Coho, or silver	496,505	10,085	4,547,210	134,672
Dog, or chum	448,224	2,624	1,959,698	11,688
Humpback, or pink			59,800	746
Sockeye, or blueback	7,350	346	2,972,050	111,734
Steelhead trout	201,469	10,121	983,267	58,442
Total	3,047,781	136,635	14,224,238	499,625
DIVER NETS.				
Chinook, or king	264,281	17,233	264,281	17,233
Coho, or silver	2,000	60	2,000	60
Steelhead trout	82,533	4,127	82,533	4,127
Total	348,814	21,420	348,814	21,420
REEF NETS.				
Chinook, or king			45,000	2,250
Coho, or silver			136,000	4,080
Dog, or chum			96,000	500
Sockeye, or blueback			365,000	14,600
Total			642,000	21,430
TRAP NETS.				
Chinook, or king	1,141,323	63,217	5,453,851	315,371
Coho, or silver	1,040,361	21,244	9,349,310	217,487
Dog, or chum	782,304	4,414	7,530,128	44,284
Humpback, or pink			16,994,786	44,203
Sockeye, or blueback	116,245	5,261	56,269,490	2,028,243
Steelhead trout	480,861	24,229	559,348	28,212
Total	3,561,094	118,365	96,156,913	2,677,800
WHEELS.				
Chinook, or king	367,376	21,471	367,376	21,471
Coho, or silver	332,831	7,084	332,831	7,084
Sockeye, or blueback	185,642	7,866	185,642	7,866
Steelhead trout	256,552	12,321	256,552	12,321
Total	1,142,401	48,742	1,142,401	48,742
LINES.				
Chinook, or king			110,880	4,800
Coho, or silver			852,534	25,149
Dog, or chum			4,000	20
Total			967,414	29,969
TOTAL.				
Chinook, or king	4,218,748	250,472	11,016,476	604,906
Coho, or silver	2,116,298	45,365	21,328,466	554,157
Dog, or chum	1,230,528	7,038	25,520,426	164,300
Humpback, or pink			17,495,586	46,187
Sockeye, or blueback	366,049	16,210	77,280,989	2,835,666
Steelhead trout	1,484,858	73,723	2,427,251	130,486
Grand total	9,416,481	392,808	155,069,194	4,335,702

Products canned.—Of the total pack of 1,926,539 cases, valued at $8,681,843, 1,757,539 cases, valued at $7,917,608, were packed on Puget Sound. One of the canneries operating on the Columbia River brought some sockeyes from Puget Sound, and the Puget Sound packers could have packed many more humpbacks than they did, but refrained from doing so because of the low prices prevailing at the time for canned humpbacks.

PACK OF CANNED SALMON IN WASHINGTON IN 1909.

Products.	Puget Sound.		Grays Harbor.		Willapa Harbor.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.
Chinook, or king, red:						
½-pound flat	655	$2,620				
1-pound flat	8,278	49,668			197	$837
1-pound flat exports						
1-pound tall	2,003	10,817	3,544	$15,594	1,258	5,032
Total	10,936	63,105	3,544	15,594	1,455	5,869
Chinook, or king, white:						
1-pound flat	2,033	8,210				
1-pound tall	378	1,289	2,177	5,225		
Total	2,411	9,499	2,177	5,225		
Coho, or silver:						
½-pound flat	24,061	65,771	1,088	3,046		
1-pound flat	21,431	103,268	1,176	5,174		
1-pound tall	109,249	458,845	7,299	29,926	4,822	17,359
2-pound nominal	427	2,562				
Total	155,168	630,446	9,563	38,146	4,822	17,359
Chum, or dog:						
½-pound flat					1,300	1,950
1-pound flat	219	591				
1-pound tall	53,469	128,325	5,047	11,608	5,097	11,213
Total	53,688	128,916	5,047	11,608	6,397	13,163
Humpback, or pink:						
1-pound flat	2,030	5,585				
1-pound tall	368,963	896,757				
Total	370,993	902,342				
Sockeye, or blueback:						
½-pound flat	224,455	906,770				
1-pound flat	454,381	2,728,186	244	1,464		
1-pound tall	485,507	2,548,344	1,405	7,587		
Total	1,164,343	6,183,300	1,649	9,051		
Grand total	1,757,539	7,917,608	21,980	79,624	12,674	36,391

PACK OF CANNED SALMON IN WASHINGTON IN 1909—Continued.

Products.	Columbia River.		Total.	
	Cases.	Value.	Cases.	Value.
Chinook, or king, red:				
½-pound flat	22,895	$96,160	23,550	$98,780
1-pound flat	30,222	210,134	38,697	260,639
1-pound flat exports	606	4,242	606	4,242
1-pound tall	12,066	78,636	18,871	110,079
1-pound oval	1,110	10,212	1,110	10,212
Total	66,899	399,384	82,834	483,952
Chinook, or king, white:				
1-pound flat			2,033	8,210
1-pound tall			2,555	6,514
Total			4,588	14,724
Coho, or silver:				
½-pound flat	9,143	25,600	34,292	94,417
1-pound flat	6,278	26,313	28,885	134,755
1-pound tall	15,638	63,900	137,008	570,030
2-pound nominal			427	2,562
Total	31,059	115,813	200,612	801,764
Chum, or dog:				
½-pound flat			1,300	1,950
1-pound flat			219	591
1-pound tall	20,051	46,786	83,664	197,932
Total	20,051	46,786	85,183	200,473
Humpback, or pink:				
1-pound flat			2,030	5,585
1-pound tall			368,963	896,757
Total			370,993	902,342
Sockeye, or blueback:				
½-pound flat	[a] 5,047	21,197	229,502	927,967
1-pound flat	2,087	17,017	456,712	2,746,667
1-pound tall	567	3,062	487,479	2,558,993
Total	7,701	41,276	1,173,693	6,233,627
Steelhead trout:				
½-pound flat	945	2,937	945	2,937
1-pound flat	3,794	19,422	3,794	19,422
1-pound tall	3,897	22,602	3,897	22,602
Total	8,636	44,961	8,636	44,961
Grand total	134,346	648,220	[b] 1,926,539	8,681,843

[a] Includes 997 cases, valued at $4,187, packed with sockeyes from Puget Sound.
[b] All 1-pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans. Reduced to a common basis of cases containing 48 1-pound cans, the pack is 1,781,317½ cases.

Miscellaneous products.—By far the greater part of the miscellaneous secondary products were prepared on Puget Sound. Pickled salmon predominate in quantity, but mild-cured salmon represent the greatest value.

MISCELLANEOUS SECONDARY PRODUCTS PACKED IN WASHINGTON IN 1909.

NOTE.—Mild-cured salmon have been figured on a basis of 800 pounds to the tierce and pickled fish on a basis of 200 pounds to the barrel.

Products.	Puget Sound.		Grays Harbor.		Willapa Harbor.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Frozen:						
Coho, or silver, round	396,477	$21,989				
Coho, or silver, dressed	60,000	4,200				
Dog, or chum, round	1,099,985	55,250				
Dog, or chum, dressed	264,687	11,911				
Humpback, round	62,945	1,888				
King, or spring, round	70,183	7,018				
King, or spring, dressed	4,000	400				
Steelhead trout, round	202,165	18,195	70,000	$6,300		
Total	2,160,442	120,851	70,000	6,300		
Mild cured:						
King, or spring	1,687,200	210,770	60,000	9,000	23,200	$1,856
Pickled:						
King, or spring			1,000	540		
King, or spring, bellies						
Dog, or chum	50,000	175				
Humpback	1,615,000	48,450				
Humpback bellies	172,400	8,620				
Total	1,837,400	57,245	1,000	540		
Smoked:						
Coho, or silver	30,000	1,800				
Dog, or chum	517,245	25,862				
Dog, or chum, kippered	5,000	500				
Humpback backs, kippered	100,000	5,000				
King, or spring	30,165	2,413				
King, or spring, white, kippered	190,500	16,050				
Total	872,910	51,625				
Fertilizer	1,210,000	18,610				
Oil	380,648	14,161				
Grand total	8,148,600	473,262	131,000	15,840	23,200	1,856

MISCELLANEOUS SECONDARY PRODUCTS PACKED IN WASHINGTON IN 1909—Continued.

Products.	Columbia River.		Total.	
	Pounds.	Value.	Pounds.	Value.
Frozen:				
Coho, or silver, round	72,000	$3,960	468,477	$25,949
Coho, or silver, dressed			60,000	4,200
Dog, or chum, round			1,099,985	55,250
Dog, or chum, dressed			264,687	11,911
Humpback, round			62,945	1,888
King, or spring, round			70,183	7,018
King, or spring, dressed			4,000	400
Steelhead trout, round	232,000	22,120	504,165	46,615
Total	304,000	26,080	2,534,442	153,231
Mild cured:				
King, or spring	522,400	52,200	2,292,800	273,826
Pickled:				
King, or spring			1,000	540
King, or spring, bellies	6,750	671	6,750	671
Dog, or chum			50,000	175
Humpback			1,615,000	48,450
Humpback bellies			172,400	8,620
Total	6,750	671	1,845,150	58,456
Smoked:				
Coho, or silver			30,000	1,800
Dog, or chum			517,245	25,862
Dog, or chum, kippered			5,000	500
Humpback backs, kippered			100,000	5,000
King, or spring			30,165	2,413
King, or spring, white, kippered			190,500	16,050
Total			872,910	51,625
Fertilizer			1,210,000	18,610
Oil			[a] 380,648	14,161
Grand total	833,150	78,951	9,135,950	569,909

[a] Represents 50,713 gallons.

COLUMBIA RIVER.

As the Columbia River forms the boundary between Oregon and Washington and the citizens of both States operate in the river, for convenience tables showing persons employed, investment, catch, and the packs of canned salmon and miscellaneous secondary products on both sides of the river are combined in the tables given below, in addition to showing most of these data in the regular state tables.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF THE COLUMBIA RIVER IN 1909.

Occupation and race.	Number.	Occupation and race.	Number.
Fishermen: Whites	4,443	Transporters: Whites	80
Shoresmen:		Total:	
Whites	426	Whites	4,949
Chinese	417	Chinese	417
Japanese	268	Japanese	268
Total	1,111	Grand total	5,634

INVESTMENT IN THE SALMON FISHERIES OF THE COLUMBIA RIVER IN 1909.

Items.	Number.	Value.	Items.	Number.	Value.
Transporting vessels:			Apparatus, shore fisheries–Con.		
Power vessels	39	$118,400	Gill nets, drift	2,755	$571,305
Tonnage	335		Gill nets, set	443	8,163
Outfit		29,875	Diver nets	166	32,535
Power boats	14	26,550	Trap nets	346	562,700
Fishing boats, power	425	222,700	Wheels, stationary	39	389,000
Fishing boats, sail and row	1,923	254,395	Wheels, scow	12	30,500
Scows and house boats	110	51,950	Shore and accessory property		1,577,300
Pile drivers	37	23,300	Cash capital		647,000
Apparatus, shore fisheries:					
Haul seines	52	21,250	Total		4,567,423
Purse seines	2	500			

CATCH, BY APPARATUS AND SPECIES, IN THE SALMON FISHERIES OF THE COLUMBIA RIVER IN 1909.

Apparatus and species.	Pounds.	Value.	Apparatus and species.	Pounds.	Value.
PURSE SEINES.			TRAP NETS.		
Chinook, or king	8,919	$535	Blueback, or sockeye	141,265	$6,387
Coho, or silver	2,184	44	Chinook, or king	1,198,383	65,823
Blueback, or sockeye	1,090	49	Dog, or chum	931,564	5,188
Steelhead trout	4,742	190	Silver, or coho	1,602,581	32,888
			Steelhead trout	527,071	26,540
Total	16,935	818			
			Total	4,400,864	136,826
HAUL SEINES.					
			WHEELS.		
Blueback, or sockeye	110,503	5,183			
Chinook, or king	1,392,377	85,261	Blueback, or sockeye	949,165	38,898
Dog, or chum	24,000	150	Chinook, or king	1,091,751	64,082
Silver, or coho	506,439	12,135	Silver, or coho	603,453	12,683
Steelhead trout	1,078,118	52,562	Steelhead trout	592,819	27,835
Total	3,111,437	155,291	Total	3,237,188	143,498
GILL NETS.			TOTAL.		
Blueback, or sockeye	8,350	396	Blueback, or sockeye	1,210,373	50,913
Chinook, or king	11,958,512	667,221	Chinook, or king	16,534,480	938,808
Dog, or chum	542,472	3,223	Dog, or chum	1,498,036	8,561
Silver, or coho	792,774	16,504	Silver, or coho	3,509,431	74,314
Steelhead trout	515,940	25,292	Steelhead trout	2,803,023	136,636
Total	13,818,048	712,636	Grand total	25,555,343	1,209,232
DIVER NETS.					
Chinook, or king	884,538	55,886			
Silver, or coho	2,000	60			
Steelhead trout	84,333	4,217			
Total	970,871	60,163			

CANNED PACK ON BOTH SIDES OF THE COLUMBIA RIVER IN 1909.

Products.	Cases.[a]	Value.
Blueback, or sockeye:		
½-pound flat	[b] 37,118	$154,292
1-pound flat	8,732	56,887
1-pound tall	[c] 617	3,382
Total	46,467	214,561
Chinook, or king:		
½-pound flat	90,281	379,181
1-pound flat	84,212	603,651
1-pound flat exports	606	4,242
1-pound tall	29,519	193,827
½-pound oval	534	2,670
1-pound oval	1,919	18,142
2-pound nominal	458	1,833
Total	207,529	1,203,546
Chum, or dog:		
1-pound tall	24,542	57,115
Humpback, or pink:		
1-pound tall	[d] 55	$132
Silverside, coho, or white:		
½-pound flat	12,447	34,852
1-pound flat	14,498	62,468
1-pound tall	21,455	87,750
Total	48,400	185,070
Steelhead trout:		
½-pound flat	8,009	25,021
1-pound flat	5,159	27,117
1-pound tall	8,217	47,658
Total	21,385	99,796
Grand total	348,378	1,760,220

[a] All 1-pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans.
[b] Of these, 5,592 cases, valued at $22,883, were filled with sockeyes brought from Puget Sound, Wash.
[c] Of these, 50 cases, valued at $320, were filled with sockeyes brought from Puget Sound, Wash.
[d] Filled with fish brought from Puget Sound, Wash.

PACK OF MISCELLANEOUS PRODUCTS ON BOTH SIDES OF THE COLUMBIA RIVER IN 1909.

Products.	Pounds.	Value.
Frozen:		
Chinook	14,000	$1,400
Silverside	288,175	17,828
Steelhead trout	1,646,662	163,887
Total	1,948,837	183,115
Mild-cured:		
Chinook	4,432,246	443,184
Pickled:		
Chinook bellies	6,750	671
Smoked:		
Chinook	127,700	$19,155
Silverside	20,000	2,000
Total	147,700	21,155
Grand total	6,535,533	648,125

OREGON.

The catch of salmon in the Columbia River in 1909 was only fair, owing partly to the shortening of the open fishing season. On the coast streams conditions were far from favorable. Low water at one time kept the salmon from entering the streams; afterwards freshets and storms made fishing impossible at times. A few places, however, show increases over the previous year.

STATISTICS BY COUNTIES.

Persons employed.—The total number of persons employed was 5,320. All of the fishermen and transporters were whites. Clatsop County, in which Astoria is located, has more than half of the persons employed.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF OREGON, BY COUNTIES AND NATIONALITIES, IN 1909.

Counties.	Fishermen.	Shoresmen				Transporters.	Total.			
	Whites.	Whites.	Chinese.	Japanese.	Total.	Whites.	Whites.	Chinese.	Japanese.	Total.
Wasco	48	21	33	8	62		69	33	8	110
Hood River	6						6			6
Multnomah	88	29	68	42	139	2	119	68	42	229
Clackamas	86						86			86
Columbia	149	21			21	8	178			178
Clatsop	2,863	258	152	145	555	37	3,158	152	145	3,455
Tillamook	154	11	50	9	70	4	169	50	9	228
Lincoln	144	9	19	14	42		153	19	14	186
Lane	121	7	30	14	51	2	130	30	14	174
Douglas	100	5	19	10	34	2	107	19	10	136
Coos	276	26	36	14	76	10	312	36	14	362
Curry	33	15	4		19	5	53	4		57
Josephine	111	2			2		113			113
Total	4,179	404	411	256	1,071	70	4,653	411	256	5,320

Investment, apparatus, etc.—The total investment amounted to $3,641,775, of which more than one-half is contributed by Clatsop County. The gill net is the principal form of apparatus used in most counties.

INVESTMENT IN THE SALMON FISHERIES OF OREGON, BY COUNTIES, IN 1909.

Items.	Wasco.		Hood River.		Multnomah.		Clackamas.		Columbia.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels					1	$4,000			4	$10,900
Tonnage					11				26	
Outfit						600				1,570
Power boats					1	1,000			2	1,800
Fishing boats, power	1	$2,000			16	7,900			76	17,100
Fishing boats, sail and row	16	800	6	$240	53	2,300	43	$1,290	33	1,810
Scows and house boats					5	1,350			4	1,500
Apparatus, shore fisheries:										
Haul seines	1	500			1	400			4	1,400
Gill nets, drift					8	560	72	3,470		
Gill nets, set	4	70	20	360	52	871	71	792	50	920
Diver nets					26	6,250			89	15,825
Pound nets									10	6,750
Wheels, stationary	14	260,000			12	53,000				
Wheels, scow	4	6,000			5	16,000				
Shore and accessory property		261,600				123,015		115		69,565
Cash capital		45,000				103,500				15,000
Total		575,970		600		320,746		5,667		144,140

INVESTMENT IN THE SALMON FISHERIES OF OREGON, BY COUNTIES, IN 1909—Continued.

Items.	Clatsop.		Tillamook.		Lincoln.		Lane.		Douglas.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	16	$58,200	2	$7,300			1	$3,000	1	$2,000
Tonnage	163		16				7		5	
Outfit		14,630		1,750				950		400
Power boats	8	21,500	1	2,000	2	$600				
Fishing boats, power	157	97,100	3	600	3	1,500	6	1,200		
Fishing boats, sail and row	1,210	188,515	74	5,550	73	5,925	90	2,670	50	2,100
Scows and house boats	82	38,860					7	1,020		
Pile drivers	2	1,800								
Apparatus, shore fisheries:										
Haul seines	28	10,600					1	130		
Gill nets, drift	2,131	466,175	63	8,230	112	10,400	51	6,195	30	2,125
Gill nets, set	115	2,550	151	4,530	153	4,490	108	1,502	116	4,420
Diver nets	3	300								
Pound nets	11	19,000								
Shore and accessory property		774,815		69,883		41,848		17,100		21,589
Cash capital		265,000		28,000		12,500		13,500		12,000
Total		1,959,045		127,843		77,263		47,267		44,634

Items.	Coos.		Curry.		Josephine.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:								
Power vessels	4	$24,500	1	$10,000			30	$119,900
Tonnage	34		26				288	
Outfit		4,100		1,350				25,350
Power boats			1	2,000			15	28,900
Fishing boats, power	25	12,200					287	139,600
Fishing boats, sail and row	164	8,125	22	3,300	56	$1,920	1,890	224,545
Scows and house boats	16	2,320					114	45,050
Pile drivers							2	1,800
Apparatus, shore fisheries:								
Haul seines	8	2,350	1	300	4	600	[a] 48	16,280
Gill nets, drift	279	23,176	6	800	66	2,200	[b] 2,818	523,331
Gill nets, set	166	4,720	102	2,305	14	84	[c] 1,122	27,614
Diver nets							[d] 418	22,375
Pound nets							21	25,750
Wheels, stationary							26	313,000
Wheels, scow							9	22,000
Shore and accessory property		67,400		100,400		7,450		1,554,780
Cash capital		42,000		15,000				551,500
Total		190,891		135,455		12,254		3,641,775

[a] Aggregate length of 22,855 yards.
[b] Aggregate length of 1,187,832 yards.
[c] Aggregate length of 59,625 yards.
[d] Aggregate length of 46,600 yards.

Products.—The total catch amounted to 22,191,291 pounds, valued at $968,983, of which Clatsop County contributed more than one-half. Gill nets catch more than two-thirds of the total. Chinook salmon constitute more than one-half of the total catch.

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY SPECIES AND APPARATUS, IN 1909.

Apparatus and species.	Wasco.		Hood River.		Multnomah.		Clackamas.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
SEINES.								
Blueback					6,000	$300		
Chinook, fresh					41,000	2,870		
Silver	206,000	$4,120						
Steelhead trout	105,280	4,120			4,000	200		
Total	311,280	8,240			51,000	3,370		
GILL NETS.								
Blueback					1,000	50		
Chinook, fresh	1,800	144	9,700	$679	18,000	770	208,000	$8,320
Silver	2,600	78	14,700	521	17,100	513	7,000	210
Steelhead trout	800	48	5,500	306	20,900	975	24,000	720
Total	5,200	270	29,900	1,506	57,000	2,308	239,000	9,250
DIVER NETS.								
Chinook					131,757	9,223		
Steelhead trout					1,800	90		
Total					133,557	9,313		
WHEELS.								
Blueback	534,555	21,382			228,968	9,650		
Chinook, fresh	497,805	28,998			226,570	13,613		
Silver	243,000	4,860			27,622	739		
Steelhead trout	272,835	13,232			63,432	2,282		
Total	1,548,195	68,472			546,592	26,284		
TOTAL.								
Blueback	534,555	21,382			235,968	10,000		
Chinook, fresh	499,605	29,142	9,700	679	417,327	26,476	208,000	8,320
Silver	451,600	9,058	14,700	521	44,722	1,252	7,000	210
Steelhead trout	378,915	17,400	5,500	306	90,132	3,547	24,000	720
Grand total	1,864,675	76,982	29,900	1,506	788,149	41,275	239,000	9,250

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY SPECIES AND APPARATUS, IN 1909—Continued.

Apparatus and species.	Columbia.		Clatsop.		Tillamook.		Lincoln.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
SEINES.								
Blueback	....	....	48,781	$2,195	....	....	....	....
Chinook, fresh	64,115	$3,506	744,646	44,328	....	....	....	....
Dog	....	....	24,000	150	....	....	....	....
Silver	5,419	108	52,603	1,059	....	....	....	....
Steelhead	83,073	4,154	427,064	21,353	....	....	....	....
Total	152,607	7,768	1,297,094	69,085	....	....	....	....
GILL NETS.								
Chinook, fresh	....	....	9,826,779	543,849	417,827	$11,916	255,268	$12,073
Dog	....	....	94,248	599	323,480	1,617	72,360	453
Silver	....	....	254,869	5,097	421,587	12,244	580,182	16,755
Steelhead	129,200	6,460	134,071	6,662	5,000	100	6,200	248
Total	129,200	6,460	10,309,967	556,207	1,167,894	25,877	914,010	29,529
DIVER NETS.								
Chinook	476,500	28,710	12,000	720	....	....	....	....
POUND NETS.								
Blueback	....	....	25,020	1,126	....	....	....	....
Chinook, fresh	13,450	59	43,610	2,547	....	....	....	....
Dog	145,100	748	4,160	26	....	....	....	....
Silver	544,000	11,280	18,220	364	....	....	....	....
Steelhead	13,600	680	32,610	1,631	....	....	....	....
Total	716,150	12,767	123,620	5 694	....	....	....	....
TOTAL.								
Blueback	....	....	73,801	3,321	....	....	....	....
Chinook, fresh	554,065	32,275	10,627,035	591,444	417,827	11,916	255,268	12,073
Dog	145,100	748	122,408	775	323,480	1,617	72,360	453
Silver	549,419	11,388	325,692	6,520	421,587	12,244	580,182	16,755
Steelhead trout	225,873	11,294	593,745	29,646	5,000	100	6,200	248
Grand total	1,474,457	55,705	11,742,681	631,706	1,167,894	25,877	914,010	29,529

Apparatus and species.	Lane.		Douglas.		Coos.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
SEINES.						
Chinook, fresh	5,000	$125	....	....	16,200	$466
Silver	8,000	200	....	....	176,452	4,411
Steelhead	....	....	....	....	3,900	78
Total	13,000	325	....	....	196,552	4,955
GILL NETS.						
Chinook, fresh	82,304	2,057	62,912	$1,573	127,581	3,497
Chinook, salted	12,000	480	....	....	....	....
Dog	....	....	36,000	225	....	....
Silver	970,348	24,256	351,072	8,728	1,210,048	30,251
Steelhead	....	....	13,000	260	55,000	1,100
Total	1,064,652	26,793	462,984	10,786	1,392,629	34,848
TOTAL.						
Chinook, fresh	87,304	2,182	62,912	1,573	143,781	3,963
Chinook, salted	12,000	480	....	....	....	....
Dog	....	....	36,000	225	....	....
Silver	978,348	24,456	351,072	8,728	1,386,500	34,662
Steelhead trout	....	....	13,000	260	58,900	1,178
Grand total	1,077,652	27,118	462,984	10,786	1,589,181	39,803

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY SPECIES AND APPARATUS, IN 1909—Continued.

Apparatus and species.	Curry.		Josephine.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
SEINES.						
Blueback					54,781	$2,495
Chinook, fresh	25,652	$292	5,248	$330	901,861	51,917
Dog					24,000	150
Silver					448,474	9,898
Steelhead					623,317	29,905
Total	25,652	292	5,248	330	2,052,433	94,365
GILL NETS.						
Blueback					1,000	50
Chinook, fresh	462,000	4,620	165,090	10,691	11,637,261	600,189
Chinook, salted					12,000	480
Dog					526,088	2,894
Silver	72,000	1,200	1,698	210	3,903,204	100,063
Steelhead	107,100	2,018	1,920	85	502,691	18,982
Total	641,100	7,838	168,708	10,986	16,582,244	722,658
DIVER NETS.						
Chinook, fresh					620,257	38,653
Steelhead					1,800	90
Total					622,057	38,743
POUND NETS.						
Blueback					25,020	1,126
Chinook, fresh					57,060	2,606
Dog					149,260	774
Silver					562,220	11,644
Steelhead					46,210	2,311
Total					839,770	18,461
WHEELS.						
Blueback					763,523	31,032
Chinook, fresh					724,375	42,611
Silver					270,622	5,599
Steelhead					336,267	15,514
Total					2,094,787	94,756
TOTAL.						
Blueback					844,324	34,703
Chinook, fresh	487,652	4,912	170,338	11,021	13,940,814	735,976
Chinook, salted					12,000	480
Dog					699,348	3,818
Silver	72,000	1,200	1,698	210	5,184,520	127,204
Steelhead trout	107,100	2,018	1,920	85	1,510,285	66,802
Grand total	666,752	8,130	173,956	11,316	22,191,291	968,983

STATISTICS BY WATERS.

Persons employed.—The Columbia River furnishes about four-fifths of the total number of persons employed. The Coquille River is second and the Siuslaw River third in this respect.

Persons Employed in the Salmon Fisheries of Oregon, by Waters and Nationalities, in 1909.

Occupation and nationality.	Columbia River.	Nehalem River.	Tillamook Bay.	Nestucca River.	Siletz River.	Yaquina Bay and River.	Alsea Bay and River.
Fishermen: Whites	3,240	48	46	60	16	63	65
Shoresmen:							
Whites	329	5	6	....	2	2	5
Chinese	253	23	27	....	....	5	14
Japanese	195	6	3	....	....	5	9
Total	777	34	36	....	2	12	28
Transporters: Whites	47	....	4	....	....	....	....
Total:							
Whites	3,616	53	56	60	18	65	70
Chinese	253	23	27	....	....	5	14
Japanese	195	6	3	....	....	5	9
Grand total	4,064	82	86	60	18	75	93

Occupation and nationality.	Siuslaw River.	Umpqua River.	Coos Bay.	Coquille River.	Rogue River.	Total.
Fishermen: Whites	121	100	114	162	144	4,179
Shoresmen:						
Whites	7	5	14	12	17	404
Chinese	30	19	14	22	4	411
Japanese	14	10	4	10	....	256
Total	51	34	32	44	21	1,071
Transporters: Whites	2	2	10	....	5	70
Total:						
Whites	130	107	138	174	166	4,653
Chinese	30	19	14	22	4	411
Japanese	14	10	4	10	....	256
Grand total	174	136	156	206	170	5,320

Investment, apparatus, etc.—More than two-thirds of the investment is found on the Columbia River, and this is the only river on which diver nets, pound or trap nets, and wheels are employed.

INVESTMENT IN THE SALMON FISHERIES OF OREGON, BY WATERS, IN 1909.

Items.	Columbia River.		Nehalem River.		Tillamook Bay.		Nestucca River.		Siletz River.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	21	$73,100			2	$7,300				
Tonnage	200				16					
Outfit		16,800				1,750				
Power boats	11	24,300			1	2,000			1	$200
Fishing boats, power	250	124,100			3	600				
Fishing boats, sail and row	1,361	194,955	24	$1,800	20	1,500	30	$2,250	9	1,425
Scows and house boats	91	41,710								
Pile drivers	2	1,800								
Apparatus, shore fisheries:										
Haul seines	34	12,900								
Gill nets, drift	2,211	470,205	17	1,980	26	3,250	20	3,000	3	300
Gill nets, set	312	5,563	70	2,100	31	930	50	1,500	8	240
Diver nets	118	22,375								
Pound, or trap, nets	21	25.750								
Wheels, stationary	26	313,000								
Wheels, scow	9	22,000								
Shore and accessory property		1,229,110		53,078		16,605		200		17,174
Cash capital		428,500		10,000		18,000				1,000
Total		3,006,168		68,958		51,935		6,950		20,339

Items.	Yaquina Bay and River.		Alsea Bay and River.		Siuslaw River.		Umpqua River.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:								
Power vessels					1	$3,000	1	$2,000
Tonnage					7		5	
Outfit						950		400
Power boats			1	$400				
Fishing boats, power	3	$1,500			6	1,200		
Fishing boats, sail and row	30	2,600	34	1,900	90	2,670	50	2,100
Scows and house boats					7	1,020		
Apparatus, shore fisheries:								
Haul seines					1	130		
Gill nets, drift	60	5,200	49	4,900	51	6,195	30	2,125
Gill nets, set	80	2,300	65	1,950	108	1,502	116	4,420
Shore and accessory property		5,500		19,174		17,100		21,589
Cash capital		1,000		10,500		13,500		12,000
Total		18,100		38,824		47,267		44,634

Items.	Coos Bay.		Coquille River.		Rogue River.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:								
Power vessels	4	$24,500			1	$10,000	30	$119,900
Tonnage	34				26		288	
Outfit		4,100				1,350		25,350
Power boats					1	2,000	15	28,900
Fishing boats, power	22	11,600	3	$600			287	139,600
Fishing boats, sail and row	26	3,325	138	4,800	78	5,220	1,892	224,545
Scows and house boats	5	890	11	1,430			114	45,050
Pile drivers							2	1,800
Apparatus, shore fisheries:								
Haul seines	2	550	6	1,800	5	900	48	16,280
Gill nets, drift	165	14,176	114	9,000	72	3,000	2,818	523,331
Gill nets, set	46	1,120	120	3,600	116	2,389	1,122	27,614
Diver nets							418	22,375
Pound, or trap, nets							21	25,750
Wheels, stationary							26	313,000
Wheels, scow							9	22,000
Shore and accessory property		46,000		21,400		107,850		1,554,780
Cash capital		17,000		25,000		15,000		551,500
Total		123,261		67,630		147,709		3,641,775

Catch.—The Columbia River produces more than two-thirds of the total catch, the Siuslaw River is second, and Coos Bay third. Bluebacks are taken on the Columbia River alone. The gill net is the only form of apparatus employed in most of the rivers.

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY APPARATUS, SPECIES, AND WATERS, IN 1909.

Apparatus and species.	Columbia River.		Nehalem River.		Tillamook Bay.		Nestucca River.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
HAUL SEINES.								
Blueback, or sockeye	54,781	$2,495						
Chinook, or king, fresh	849,761	50,704						
Dog, or chum	24,000	150						
Silver, or coho	264,022	5,287						
Steelhead trout	619,417	29,827						
Total	1,811,981	88,463						
GILL NETS.								
Blueback, or sockeye	1,000	50						
Chinook, or king, fresh	10,064,279	553,762	50,284	$1,509	314,810	$7,870	52,733	$2,537
Dog, or chum	94,248	599			259,856	1,299		
Silver, or coho	296,269	6,419	206,826	5,171	146,592	3,665	68,169	3,408
Steelhead trout	314,471	15,171	63,624	318	5,000	100		
Total	10,770,267	576,001	320,734	6,998	726,258	12,934	120,902	5,945
DIVER NETS.								
Chinook, or king, fresh	620,257	38,653						
Steelhead trout	1,800	90						
Total	622,057	38,743						
POUND NETS.								
Blueback, or sockeye	25,020	1,126						
Chinook, or king, fresh	57,060	2,606						
Dog, or chum	149,260	774						
Silver, or coho	562,220	11,644						
Steelhead trout	46,210	2,311						
Total	839,770	18,461						
WHEELS.								
Blueback, or sockeye	763,523	31,032						
Chinook, or king, fresh	724,375	42,611						
Silver, or coho	270,622	5,599						
Steelhead trout	336,267	15,514						
Total	2,094,787	94,756						
TOTAL.								
Blueback, or sockeye	844,324	34,703						
Chinook, or king, fresh	12,315,732	688,336	50,284	1,509	314,810	7,870	52,733	2,537
Dog, or chum	267,508	1,523			259,856	1,299		
Silver, or coho	1,393,133	28,949	206,826	5,171	146,592	3,665	68,169	3,408
Steelhead trout	1,318,165	62,913	63,624	318	5,000	100		
Grand total	16,138,862	816,424	320,734	6,998	726,258	12,934	120,902	5,945

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

Apparatus and species.	Siletz River.		Yaquina Bay and River.		Alsea Bay and River.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.						
Chinook, or king, fresh	53,690	$2,148	33,722	$1,532	167,856	$8,393
Dog, or chum			42,640	267	29,720	186
Silver, or coho			246,738	6,752	333,444	10,003
Steelhead trout					6,200	248
Total	53,690	2,148	323,100	8,551	537,220	18,830
TOTAL.						
Chinook, or king, fresh	53,690	2,148	33,722	1,532	167,856	8,393
Dog, or chum			42,640	267	29,720	186
Silver, or coho			246,738	6,752	333,444	10,003
Steelhead trout					6,200	248
Grand total	53,690	2,148	323,100	8,551	537,220	18,830

Apparatus and species.	Siuslaw River.		Umpqua River.		Coos Bay.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
HAUL SEINES.						
Chinook, or king, fresh	5,000	$125			12,100	$363
Silver, or coho	8,000	200			39,000	975
Steelhead trout					3,900	78
Total	13,000	325			55,000	1,416
GILL NETS.						
Chinook, or king, fresh	82,304	2,057	62,912	$1,573	100,181	2,812
Chinook, or king, salted	12,000	480				
Dog, or chum			36,000	225		
Silver, or coho	970,348	24,256	351,072	8,728	660,240	16,506
Steelhead trout			13,000	260	49,000	980
Total	1,064,652	26,793	462,984	10,786	809,421	20,298
TOTAL.						
Chinook, or king, fresh	87,304	2,182	62,912	1,573	112,281	3,175
Chinook, or king, salted	12,000	480				
Dog, or chum			36,000	225		
Silver, or coho	978,348	24,456	351,072	8,728	699,240	17,481
Steelhead trout			13,000	260	52,900	1,058
Grand total	1,077,652	27,118	462,984	10,786	864,421	21,714

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

Apparatus and species.	Coquille River.		Rogue River.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
HAUL SEINES.						
Blueback, or sockeye					54,781	$2,495
Chinook, or king, fresh	4,100	$103	30,900	$622	901,861	51,917
Dog, or chum					24,000	150
Silver, or coho	137,452	3,436			448,474	9,898
Steelhead trout					623,317	29,905
Total	141,552	3,539	30,900	622	2,052,433	94,365
GILL NETS.						
Blueback, or sockeye					1,000	50
Chinook, or king, fresh	27,400	685	627,090	15,311	11,637,261	600,189
Chinook, or king, salted					12,000	480
Dog, or chum					526,088	2,894
Silver, or coho	549,808	13,745	73,698	1,410	3,903,204	100,063
Steelhead trout	6,000	120	109,020	2,103	502,691	18,982
Total	583,208	14,550	809,808	18,824	16,582,244	722,658
DIVER NETS.						
Chinook, or king, fresh					620,257	38,653
Steelhead trout					1,800	90
Total					622,057	38,743
POUND NETS.						
Blueback, or sockeye					25,020	1,126
Chinook, or king, fresh					57,060	2,606
Dog, or chum					149,260	774
Silver, or coho					562,220	11,644
Steelhead trout					46,210	2,311
Total					839,770	18,461
WHEELS.						
Blueback, or sockeye					763,523	31,032
Chinook, or king, fresh					724,375	42,611
Silver, or coho					270,622	5,599
Steelhead trout					336,267	15,514
Total					2,094,787	94,756
TOTAL.						
Blueback, or sockeye					844,324	34,703
Chinook, or king, fresh	31,500	788	657,990	15,933	13,940,814	735,976
Chinook, or king, salted					12,000	480
Dog, or chum					635,724	3,500
Silver, or coho	687,260	17,181	73,698	1,410	5,184,520	127,204
Steelhead trout	6,000	120	109,020	2,103	1,573,909	67,120
Grand total	724,760	18,089	840,708	19,446	22,191,291	968,983

Products canned.—As in other branches of the industry the Columbia River leads, producing more than two-thirds of the pack of canned salmon. But little was done on the Rogue River, owing to the recent death of Mr. R. D. Hume, owner of the principal cannery. Bluebacks and steelheads were packed on the Columbia River alone. All of the humpbacks and part of the sockeyes packed on the Columbia River were brought from Puget Sound, Wash.

PACK OF CANNED SALMON IN OREGON, BY WATERS, IN 1909.

Products.	Columbia River.		Nehalem River.		Tillamook Bay.		Yaquina River and Bay.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
Blueback, or sockeye:								
½-pound flat	[a] 32,071	$133,095						
1-pound flat	6,645	39,870						
1-pound tall	[b] 50	320						
Total	38,766	173,285						
Chinook, or king:								
½-pound flat	67,386	283,021	228	$684	965	$2,895		
1-pound flat	53,990	393,517						
1-pound tall	17,453	115,191	1,643	9,858	2,128	12,768		
½-pound oval	534	2,670						
1-pound oval	809	7,930						
2-pound nominal	458	1,833						
Total	140,630	804,162	1,871	10,542	3,093	15,663		
Chum, or dog:								
1-pound tall	4,491	10,329	909	2,091	3,712	8,538	33	$76
Humpback, or pink:								
1-pound tall	[c] 55	132						
Silverside, coho, or white:								
½-pound flat	3,304	9,252	2,546	7,129	2,119	5,933		
1-pound flat	8,220	36,155						
1-pound tall	5,817	23,850	3,281	13,124	3,969	15,876	1,139	4,556
Total	17,341	69,257	5,827	20,253	6,088	21,809	1,139	4,556
Steelhead trout:								
½-pound flat	7,064	22,084						
1-pound flat	1,365	7,695						
1-pound tall	4,320	25,056						
Total	12,749	54,835						
Grand total	214,032	1,112,090	8,607	32,886	12,893	46,010	1,172	4,632

Products.	Alsea River and Bay.		Siuslaw River.		Umpqua River.		Coos Bay.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
Chinook, or king:								
½-pound flat	928	$2,784					50	$150
1-pound flat							211	1,013
1-pound tall	655	3,930	632	$3,792	500	$3,000		
1-pound oval							39	312
Total	1,583	6,714	632	3,792	500	3,000	300	1,475
Chum, or dog:								
1-pound tall	80	184						
Silverside, coho, or white:								
½-pound flat	2,601	7,283	4,017	11,248			2,088	5,846
1-pound flat							1,841	8,100
1-pound tall	4,186	16,744	5,427	21,708	7,753	31,012	759	3,036
2-pound nominal							315	945
Total	6,787	24,027	9,444	32,956	7,753	31,012	5,003	17,927
Grand total	8,450	30,925	10,076	36,748	8,253	34,012	5,303	19,402

[a] Of these, 4,595 cases, valued at $18,696, were filled with sockeyes brought from Puget Sound, Wash.
[b] Packed with sockeye salmon from Puget Sound, Wash.
[c] Packed with humpback salmon from Puget Sound, Wash.

PACK OF CANNED SALMON IN OREGON, BY WATERS, IN 1909—Continued.

Products.	Coquille River.		Rogue River.		Total.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.
Blueback, or sockeye:						
½-pound flat					32,071	$133,095
1-pound flat					6,645	39,870
1-pound tall					50	320
Total					38,766	173,285
Chinook, or king:						
½-pound flat					69,557	289,534
1-pound flat	204	$979	186	$1,300	54,591	396,809
1-pound tall	46	276			23,057	148,815
½-pound oval					534	2,670
1-pound oval					848	8,242
2-pound nominal					458	1,833
Total	250	1,255	186	1,300	149,045	847,903
Chum, or dog:						
1-pound tall					9,225	21,218
Humpback, or pink:						
1-pound tall					55	132
Silverside, coho, or white:						
½-pound flat	3,656	10,237			20,331	56,928
1-pound flat	1,226	5,394	468	2,053	11,755	51,702
1-pound tall	6,764	27,056	231	924	39,326	157,886
2-pound nominal					315	945
Total	11,646	42,687	699	2,977	71,727	267,461
Steelhead trout:						
½-pound flat					7,064	22,084
1-pound flat					1,365	7,695
1-pound tall					4,320	25,056
Total					12,749	54,835
Grand total	11,896	43,942	885	4,277	[a] 281,567	1,364,834

[a] All 1-pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans. Reduced to a common basis of 48 1-pound cans the pack is 216,788½ cases.

Miscellaneous secondary products.—The Columbia River produces a large part of the miscellaneous secondary products. Mild-cured salmon form the greater part of the pack, followed by frozen, smoked, and pickled salmon in the order named.

PACK OF MISCELLANEOUS SECONDARY PRODUCTS IN OREGON, BY WATERS, IN 1909.

Products.	Columbia River.		Nehalem River.		Tillamook Bay.		Siletz River.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Frozen:								
Chinook	14,000	$1,400						
Silverside	216,175	13,868						
Steelhead trout	1,414,662	141,767						
Total	1,644,837	157,035						
Mild-cured:								
Chinook	3,909,846	390,984	15,485	$1,239	59,595	$4,768	41,575	$4,003
Smoked:								
Chinook	127,700	19,155						
Silverside	20,000	2,000						
Total	147,700	21,155						
Grand total	5,702,383	569,174	15,485	1,239	59,595	4,768	41,575	4,003

PACK OF MISCELLANEOUS SECONDARY PRODUCTS IN OREGON, BY WATERS, IN 1909—Continued.

Products.	Alsea River and Bay.		Siuslaw River.		Umpqua River.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Mild-cured:						
Chinook	32,386	$3,158	12,000	$960	4,002	$240
Pickled:						
Chinook			400	24		
Silverside			2,600	130		
Total			3,000	154		
Grand total	32,386	3,158	15,000	1,114	4,002	240

Products.	Coos Bay.		Rogue River.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Frozen:						
Chinook					14,000	$1,400
Silverside					216,175	13,868
Steelhead trout			32,023	$2,891	1,446,685	144,658
Total			32,023	2,891	1,676,860	159,926
Mild-cured:						
Chinook	48,000	$4,800	242,553	24,673	4,365,442	434,825
Pickled:						
Chinook					400	24
Silverside					2,600	130
Total					3,000	154
Smoked:						
Chinook					127,700	19,155
Silverside					20,000	2,000
Total					147,700	21,155
Grand total	48,000	4,800	274,576	27,564	6,193,002	616,060

CALIFORNIA.

In Eel River the runs of all species of salmon were very poor. For the first few days of the season the catch was very heavy, after which the run dwindled down to almost nothing. Nearly all of these were shipped fresh to San Francisco, where the dealers claimed that most of them arrived in bad condition.

In the Sacramento River the run was a very fair one, and all of the product was marketed in either a fresh, mild-cured, or smoked condition, none being canned. The interesting table following shows the daily deliveries of chinook salmon to one of the mild-curing plants on the river, and the total and average weights of same.

DAILY DELIVERIES OF CHINOOK SALMON TO A MILD-CURING PLANT ON THE SACRAMENTO RIVER, SEASON OF 1909.

Date.	Number.	Total weight.	Average.
SPRING, 1909.			
Apr. 16	21	421	20.0
17	13	297	22.0
19	109	2,411	22.0
20	305	7,512	24.6
21	111	2,826	25.4
22	183	4,510	24.6
23	331	7,708	23.2
24	163	3,919	24.0
26	284	5,918	23.8
27	75	1,788	23.8
28	104	2,391	23.0
29	116	2,716	23.2
30	358	8,059	23.0
May 1	251	5,739	22.8
3	171	4,016	23.4
4	175	4,128	23.5
5	107	2,490	22.6
6	66	1,680	25.4
7	132	2,957	22.4
8	96	2,287	23.8
10	308	7,302	23.3
12	152	3,717	24.4
13	89	2,056	23.1
14	274	6,635	24.2
15	254	6,201	24.4
17	310	7,378	23.8
18	323	7,844	24.2
19	210	5,037	23.9
20	226	5,246	23.2
21	154	3,778	24.5
22	166	4,150	25.0
24	315	7,290	23.1
25	422	9,917	23.5
26	342	7,767	22.7
27	245	5,900	24.0
28	268	6,496	24.2
29	197	4,826	24.5
30	330	7,529	22.8
June 1	299	7,250	24.2
Total	8,019	190,092	23.7

Date.	Number.	Total weight.	Average.
FALL, 1909.			
Aug. 17	279	6,658	23.8
18	325	8,021	24.6
19	147	4,018	27.3
20	185	4,954	26.7
21	39	1,011	25.9
23	1,731	42,829	24.7
24	458	11,888	26.0
25	279	7,444	26.7
26	315	8,250	26.0
27	145	3,747	25.8
28	86	2,309	28.0
30	1,300	32,926	25.3
31	812	21,018	25.8
Sept. 1	628	16,331	26.0
2	356	9,654	27.1
3	242	6,582	27.1
4	105	2,885	27.4
6	1,176	31,640	26.9
7	915	24,277	26.5
8	758	19,874	26.2
9	704	18,851	26.7
10	677	18,204	26.8
11	369	9,592	26.0
13	1,917	49,781	25.9
14	1,343	35,555	26.4
15	751	20,097	26.7
16	647	17,328	26.7
17	1,493	35,883	24.0
Total	18,182	471,607	25.9
Grand total	26,201	661,699	25.45

The southernmost point on our coast where salmon are taken commercially is in Monterey Bay, and it is here that trolling was first engaged in to any extent. Yearly the chinooks come into Monterey and Santa Cruz Bays, where they sometimes remain feeding for months. When they strike in, which in numbers they usually do the latter part of April, they are in the pursuit of squid, sardines, anchovies, and other small fish, and their presence is first indicated to the fishermen by the occasional disturbances of the surface by the small fish. It is a signal for the fishermen and sportsmen, who go out in both sail and row boats.

During 1909 most of the catch was made in the vicinity of Monterey, the salmon appearing in but small numbers in Santa Cruz Bay.

While evidently coming in schools at first, salmon soon scatter about in pursuit of their prey, thus making the use of nets unprofitable. In a dead calm troll fishing practically ceases, but with the return of the breeze the fish resume biting.

The silver salmon come into Monterey Bay in July and are usually taken in that one month alone. Some of them run as large as 12 to 13 pounds each and all are feeding.

During 1909 the dealers had an agreement with their fishermen, who are mostly Japanese, under which they kept back a certain percentage of the price until the end of the season. This was done in order to make certain that the fishermen would not go off and sell to some one else the better fish and bring them the poorer quality.

The following table shows the daily receipts of chinook salmon at the mild-curing plant of one of the companies operating at Monterey during 1909. The table also shows the number of boats fishing, the number of fish caught, and the total weight of same, and the average weight per fish:

DAILY DELIVERIES OF CHINOOK SALMON AT A MILD-CURING PLANT ON MONTEREY BAY, SEASON OF 1909.

Date.	Number of boats.	Number of fish.	Total weight.	Average weight.	Date.	Number of boats.	Number of fish.	Total. weight.	Average weight.
1909.					1909.				
Apr. 30	70	966	10,002	18.3	June 21	106	1,808	30,090	16.6
May 1	69	319	4,096	12.8	22	110	1,678	20,576	12.2
3	12	20	369	18.4	23	104	1,135	15,964	14.0
4–5	30	152	2,512	16.5	24	111	1,811	26,826	14.5
6	41	126	1,758	14.0	25	100	595	9,549	16.0
7	35	93	1,084	11.6	26	108	615	9,645	15.0
8	23	47	602	13.0	27	46	142	1,831	12.7
10	15	47	633	13.0	28	44	212	2,719	12.8
11	28	56	770	13.4	29	88	566	7,030	12.5
12	82	642	8,210	12.5	30	101	1,175	14,499	13.0
13	83	613	6,250	10.2	July 1	111	1,416	18,363	13.0
14	93	847	9,993	11.8	2	100	634	8,576	13.5
15	103	615	7,835	12.7	3	108	1,313	16,060	12.2
16	16	26	429	16.0	6	113	1,687	24,508	15.0
17	107	1,152	14,612	12.7	7	114	1,568	20,054	13.0
18	87	318	4,607	15.0	8	116	1,428	20,401	14.25
19	63	135	1,673	12.5	9	80	971	13,350	14.0
22	31	46	667	15.0	10	114	973	13,236	13.5
23	82	476	6,043	12.7	11	88	581	8,184	14.0
24	107	1,652	23,600	14.3	12	79	400	5,196	13.0
25	114	3,390	50,621	15.0	13	62	407	4,847	12.0
26	118	1,190	17,590	12.0	14	91	466	5,469	11.7
27	54	94	1,619	17.0	15	98	513	6,166	12.0
28	68	222	3,458	15.5	16	85	495	5,713	11.6
29	93	650	9,874	15.5	17	85	506	5,697	11.25
30	118	2,852	38,567	13.5	19	55	257	3,187	12.4
31	119	1,005	14,625	14.0	20	91	422	5,565	13.1
June 1	95	493	8,273	17.0	21	62	205	3,252	15.75
2	115	1,245	20,256	17.0	22	68	356	5,178	15.0
3	109	1,000	14,304	14.0	23	79	460	6,237	13.5
4	112	724	10,437	14.0	24	95	1,284	15,391	12.0
5	96	1,615	22,571	14.0	26	108	1,176	16,437	14.0
6	114	988	12,901	13.0	27	104	1,487	22,766	15.30
7	95	485	7,042	14.5	28	105	961	18,576	19.5
8	80	307	4,804	16.0	29	88	267	5,521	20.7
9	68	200	3,437	17.0	30	59	114	2,548	22.7
10	66	243	4,786	22.0	31	47	144	2,832	19.9
11	83	348	6,187	19.0	Aug. 2	79	287	4,908	17.0
12	95	623	10,218	16.0	3	43	78	1,574	20.0
13	106	499	7,965	16.0	4	21	71	1,366	19.0
14	89	390	6,655	18.0	5	43	170	3,546	20.9
15	112	1,729	27,524	16.0	6	70	274	4,845	18.0
16	115	3,092	48,138	15.4	7	52	114	2,156	19.0
17	105	1,395	24,436	17.6	9–12	12	20	502	25.0
18	117	3,725	61,789	16.7					
19	112	2,083	35,265	17.0	Total	....	71,619	1,043,358	14.6
20	111	1,442	23,335	16.2					

STATISTICS BY COUNTIES.

Persons employed.—The total number of persons employed was 2,675, Contra Costa County leading with 774 persons.

PERSONS ENGAGED IN THE CALIFORNIA SALMON FISHERIES, BY COUNTIES, IN 1909.

Counties.	Fishermen.				Shoresmen.[a]				Transporters (whites).	Grand total.
	Whites.	Japanese.	Chinese.	Total.	Whites.	Indians.	Japanese.	Total.		
Del Norte	84			84	17	15		32	3	119
Humboldt	339			339	19			19		358
Alameda					25			25		25
Marin	8			8						8
San Francisco	60			60	60			60	8	128
Solano	420			420	50			50	24	494
Contra Costa	654			654	78			78	42	774
San Joaquin	64	24		88						88
Yolo	42			42						42
Sacramento	178			178						178
Sutter	12			12						12
Butte	45			45					5	50
Glenn	20			20	1			1		21
Tehama	45			45			5	5		50
Shasta	10			10						10
Monterey	65	144	15	224	26			26		250
Santa Cruz	68			68						68
Total	2,114	168	15	2,297	276	15	5	296	82	2,675

[a] All the shoresmen reported for Alameda County and part of those reported for San Francisco County are employed by one of the Alaskan canning companies and have been reported here, as they are employed here the whole year.

Investment, apparatus, etc.—The total investment amounts to $1,232,960. The shore property reported for Alameda County belongs to one of the companies operating in Alaska. Contra Costa leads in the total investment. Gill nets, haul seines, and trolling lines are the principal forms of apparatus in use.

INVESTMENT IN THE SALMON FISHERIES OF CALIFORNIA, BY COUNTIES, IN 1909.

Items.	Del Norte.		Humboldt.		Alameda.		Marin.		San Francisco.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	1	$3,248							1	$25,000
Tonnage	9								32	
Outfit		750								1,240
Power boats									4	7,000
Fishing boats, power									15	18,000
Fishing boats, sail and row	54	2,640	253	$6,625			4	$400	15	1,500
House boats and scows			2	100						
Apparatus, shore fisheries:										
Haul seines	4	550	17	2,450						
Gill nets, drift	50	11,300	286	19,375			4	1,050	30	7,875
Shore and accessory property		17,020		7,750		$159,550		50		155,320
Cash capital		10,000		4,500						43,500
Total		45,508		40,800		159,550		1,500		259,435

INVESTMENT IN THE SALMON FISHERIES OF CALIFORNIA, BY COUNTIES, IN 1909—Continued.

Items.	Solano.		Contra Costa.		San Joaquin.		Yolo.		Sacramento.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:										
Power vessels	1	$4,000	1	$5,500						
Tonnage	10		5							
Outfit		1,000		930						
Power boats	14	19,500	23	36,800						
Fishing boats, power	30	10,400	32	21,000	28	$8,400	4	$1,600	17	$6,800
Fishing boats, sail and row	183	36,400	300	58,500	16	2,900	17	990	77	5,170
House boats and scows	10	4,000	11	4,800			5	1,000	19	3,650
Apparatus, shore fisheries:										
Gill nets, drift	210	39,500	322	64,400	44	6,600	21	2,550	113	14,320
Hand lines				10						
Shore and accessory property		29,900		117,113		580		145		815
Cash capital		50,000		85,000						
Total		194,700		394,053		18,480		6,285		30,755

Items.	Sutter.		Butte.		Glenn.		Tehama.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Apparatus, shore fisheries:								
Fishing boats, sail and row	6	$375	20	$840	6	$300	20	$1,000
House boats and scows	3	375						
Haul seines			10	1,000	4	400	10	1,020
Gill nets, drift	6	600						
Shore and accessory property		50		2,075		600		2,150
Total		1,400		3,915		1,300		4,170

Items.	Shasta.		Monterey.		Santa Cruz.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:								
Power vessels							4	$37,748
Tonnage							56	
Outfit								3,920
Power boats							41	63,300
Fishing boats, power			24	$13,850	21	$11,000	171	91,050
Fishing boats, sail and row	4	$200	170	7,805	13	2,600	1,158	128,245
House boats and scows							50	13,925
Apparatus, shore fisheries:								
Haul seines	2	230					[a] 47	5,650
Gill nets, drift							[b] 1,086	167,570
Trolling lines				886		263		1,149
Hand lines								10
Shore and accessory property		275		3,900		100		497,393
Cash capital				30,000				223,000
Total		705		56,441		13,963		1,232,960

[a] Aggregate length of 13,449 yards. [b] Aggregate length of 438,420 yards.

Catch.—The total catch amounts to 12,141,937 pounds, valued at $585,995. Contra Costa County leads in catch, followed closely by Solano County. Nearly four-fifths of the catch was made with gill nets, while chinook salmon comprise almost all of the catch.

PRODUCTS OF THE SALMON FISHERIES OF CALIFORNIA, BY APPARATUS AND SPECIES, IN 1909.

Apparatus and species.	Del Norte.		Humboldt.		Marin.		San Francisco.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.								
Blueback			9,300	$317				
Chinook, fresh	524,225	$8,532	463,649	16,970	5,380	$310	91,063	$4,055
Chinook, salted	27,000	1,220						
Silver, fresh	50,000	900	23,000	690				
Silver, salted	20,000	1,000						
Steelhead trout			4,700	235				
Total	621,225	11,652	500,649	18,212	5,380	310	91,063	4,055
SEINES.								
Blueback			11,700	372				
Chinook, fresh			301,600	12,064				
Chinook, salted	10,000	400	32,049	2,932				
Silver, fresh			12,000	360				
Silver, salted	24,000	800	2,000	100				
Dog			4,200	84				
Total	34,000	1,200	363,549	15,912				
TOTAL.								
Blueback			21,000	689				
Chinook, fresh	524,225	8,532	765,249	29,034	5,380	310	91,063	4,055
Chinook, salted	37,000	1,620	32,049	2,932				
Silver, fresh	50,000	900	35,000	1,050				
Silver, salted	44,000	1,800	2,000	100				
Dog			4,200	84				
Steelhead trout			4,700	235				
Grand total	655,225	12,852	864,198	34,124	5,380	310	91,063	4,055

Apparatus and species.	Solano.		Contra Costa.		San Joaquin.		Yolo.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.								
Chinook, fresh	3,238,788	$168,713	3,944,902	$210,855	61,187	$2,585	197,520	$10,852
Steelhead trout			678	41				
Total	3,238,788	168,713	3,945,580	210,896	61,187	2,585	197,520	10,852
LINES.								
Steelhead trout			3,500	270				
Total			3,500	270				
TOTAL.								
Chinook, fresh	3,238,788	168,713	3,944,902	210,855	61,187	2,585	197,520	10,852
Steelhead trout			4,178	311				
Grand total	3,238,788	168,713	3,949,080	211,166	61,187	2,585	197,520	10,852

Products of the Salmon Fisheries of California, by Apparatus and Species, in 1909—Continued.

Apparatus and species.	Sacramento.		Sutter.		Butte.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.						
Chinook, fresh	599,723	$32,690	62,119	$1,917	....	....
Total	599,723	32,690	62,119	1,917	....	....
SEINES.						
Chinook, fresh	....	....	....	....	163,022	$8,285
Total	....	....	....	....	163,022	8,285
TOTAL.						
Chinook, fresh	599,723	32,690	62,119	1,917	163,022	8,285
Grand total	599,723	32,690	62,119	1,917	163,022	8,285

Apparatus and species.	Glenn.		Tehama.		Shasta.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
SEINES.						
Chinook, fresh	72,547	$3,627	314,102	$16,905	46,475	$2,789
Total	72,547	3,627	314,102	16,905	46,475	2,789
TOTAL.						
Chinook, fresh	72,547	3,627	314,102	16,905	46,475	2,789
Grand total	72,547	3,627	314,102	16,905	46,475	2,789

Apparatus and species.	Monterey.		Santa Cruz.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.						
Blueback	....	....	....	....	9,300	$317
Chinook, fresh	....	....	....	....	9,188,556	457,479
Chinook, salted	....	....	....	....	27,000	1,220
Silver, fresh	....	....	....	....	73,000	1,590
Silver, salted	....	....	....	....	20,000	1,000
Steelhead trout	....	....	....	....	5,378	276
Total	....	....	....	....	9,323,234	461,882
SEINES.						
Blueback	....	....	....	....	11,700	372
Chinook, fresh	....	....	....	....	897,746	43,670
Chinook, salted	....	....	....	....	42,049	3,332
Silver, fresh	....	....	....	....	12,000	360
Silver, salted	....	....	....	....	26,000	900
Dog	....	....	....	....	4,200	84
Total	....	....	....	....	993,695	48,718
LINES.						
Chinook	1,769,524	$72,634	37,373	$1,759	1,806,897	74,393
Silver	10,000	500	4,500	225	14,500	725
Steelhead trout	....	....	111	7	3,611	277
Total	1,779,524	73,134	41,984	1,991	1,825,008	75,395
TOTAL.						
Blueback	....	....	....	....	21,000	689
Chinook, fresh	1,769,524	72,634	37,373	1,759	11,893,199	575,542
Chinook, salted	....	....	....	....	69,049	4,552
Silver, fresh	10,000	500	4,500	225	99,500	2,675
Silver, salted	....	....	....	....	46,000	1,900
Dog	....	....	....	....	4,200	84
Steelhead trout	....	....	111	7	8,989	553
Grand total	1,779,524	73,134	41,984	1,991	12,141,937	585,995

STATISTICS BY WATERS.

Persons employed.—Of the 2,675 persons employed in the industry, 1,880 were on the Sacramento River. The next largest number was employed on Monterey Bay.

Persons Engaged in the Salmon Fisheries of California, by Waters and Nationalities, in 1909.

Occupation and race.	Smith River.	Klamath River.	Mad River.	Eureka Bay.	Eel River.	Sacramento River.	Monterey Bay.	Total.
Fishermen:								
Whites	47	37	41	7	291	1,558	133	2,114
Chinese							15	15
Japanese						24	144	168
Total	47	37	41	7	291	1,582	292	2,297
Shoresmen:								
Whites	17			6	13	214	26	276
Indians	15							15
Japanese						5		5
Total	32			6	13	219	26	296
Transporters:								
Whites		3				79		112
Total:								
Whites	64	40	41	13	304	1,851	159	2,472
Indians	15							15
Chinese							15	15
Japanese						29	144	173
Grand total	79	40	41	13	304	1,880	318	2,675

Investment, apparatus, etc.—More than nine-tenths of the total investment is represented in the Sacramento River. Trolling lines are used in Monterey Bay.

Investment in the Salmon Fisheries of California, by Waters, in 1909.

Items.	Smith River.		Klamath River.		Mad River.		Eureka Bay.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:								
Power vessels			1	$3,248				
Tonnage			9					
Outfit				750				
Fishing boats, sail and row	23	$770	31	1,870	33	$865	7	$175
Apparatus, shore fisheries:								
Haul seines	4	550			4	500		
Gill nets, drift	15	800	35	10,500	37	1,800	7	525
Shore and accessory property		420		16,600		100		900
Cash capital				10,000				1,500
Total		2,540		42,968		3,265		3,100

INVESTMENT IN THE SALMON FISHERIES OF CALIFORNIA, BY WATERS, IN 1909—Continued.

Items.	Eel River.		Sacramento River.		Monterey Bay.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:								
Power vessels			3	$34,500			4	$37,748
Tonnage			47				56	
Outfit				3,170				3,920
Power boats			41	63,300			41	63,300
Fishing boats, power			126	66,200	45	$24,850	171	91,050
Fishing boats, sail and row	213	$5,585	668	108,575	183	10,405	1,158	128,245
Scows and house boats	2	100	48	13,825			50	13,925
Apparatus, shore fisheries:								
Haul seines	13	1,950	26	2,650			47	5,650
Gill nets, drift	242	17,050	750	136,895			1,086	167,570
Trolling lines						1,149		1,149
Hand lines				10				10
Shore and accessory property		6,750		468,623		4,000		497,393
Cash capital		3,000		178,500		30,000		223,000
Total		34,435		1,076,248		70,404		1,232,960

Catch.—About four-fifths of the total catch was made on the Sacramento River; Monterey Bay was second and Eel River third. With the exception of Monterey Bay, gill nets take the largest part of the catch on all the waters. The catch of species other than chinook is very small.

PRODUCTS OF THE SALMON FISHERIES OF CALIFORNIA, BY APPARATUS, SPECIES, AND WATERS, IN 1909.

Apparatus and species.	Smith River.		Klamath River.		Mad River.		Eureka Bay.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.								
Blueback					3,800	$152		
Chinook, fresh	40,000	$1,200	484,225	$7,332	50,000	2,000	28,000	$840
Chinook, salted	20,000	800	7,000	420				
Silver, fresh			50,000	900	12,000	360		
Silver, salted			20,000	1,000				
Total	60,000	2,000	561,225	9,652	65,800	2,512	28,000	840
HAUL SEINES.								
Blueback					2,100	84		
Chinook, fresh					28,000	1,120		
Chinook, salted	10,000	400			6,000	360		
Silver, fresh					7,000	210		
Silver, salted	24,000	800						
Total	34,000	1,200			43,100	1,774		
TOTAL.								
Blueback					5,900	236		
Chinook, fresh	40,000	1,200	484,225	7,332	78,000	3,120	28,000	840
Chinook, salted	30,000	1,200	7,000	420	6,000	360		
Silver, fresh			50,000	900	19,000	570		
Silver, salted	24,000	800	20,000	1,000				
Grand total	94,000	3,200	561,225	9,652	108,900	4,286	28,000	840

PRODUCTS OF THE SALMON FISHERIES OF CALIFORNIA, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

Apparatus and species.	Eel River.		Sacramento River.		Monterey Bay.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.								
Blueback	5,500	$165					9,300	$327
Chinook, fresh	385,649	14,130	8,200,682	$431,977			9,188,556	457,479
Chinook, salted							27,000	1,220
Silver, fresh	11,000	330					73,000	1,590
Silver, salted							20,000	1,000
Steelhead trout	4,700	235	678	41			5,378	276
Total	406,849	14,860	8,201,360	432,018			9,323,234	461,892
HAUL SEINES.								
Blueback	9,600	288					11,700	372
Chinook, fresh	273,600	10,944	596,146	31,606			897,746	43,670
Chinook, salted	26,049	2,572					42,049	3,332
Dog, or chum	4,200	84					4,200	84
Silver, fresh	5,000	150					12,000	360
Silver, salted	2,000	100					26,000	900
Total	320,449	14,138	596,146	31,606			993,695	48,718
LINES.								
Chinook					1,806,897	$74,393	1,806,897	74,393
Silver					14,500	725	14,500	725
Steelhead trout			3,500	270	111	7	3,611	277
Total			3,500	270	1,821,508	75,125	1,825,008	75,395
TOTAL.								
Blueback	15,100	453					21,000	689
Chinook, fresh	659,249	25,074	8,796,828	463,583	1,806,897	74,393	11,893,199	575,542
Chinook, salted	26,049	2,572					69,049	4,552
Dog, or chum	4,200	84					4,200	84
Silver, fresh	16,000	480			14,500	725	99,500	2,675
Silver, salted	2,000	100					46,000	1,900
Steelhead trout	4,700	235	4,178	311	111	7	8,989	553
Grand total	727,298	28,998	8,801,006	463,894	1,821,508	75,125	12,141,937	585,995

Products canned.—But one cannery was operated in 1909, and that at Requa, on the Klamath River. The pack of this cannery was 5,663 cases of 1-pound flat chinooks, which sold for $28,315.

Miscellaneous secondary products.—Mild-cured and smoked salmon comprise the secondary products prepared.

PACK OF MISCELLANEOUS SECONDARY PRODUCTS IN CALIFORNIA, BY WATERS, IN 1909.

Products.	Eel River.		Sacramento River.		Monterey Bay.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Mild-cured:								
Chinook	64,000	$6,400	4,095,162	$450,019	728,800	$64,049	4,887,962	$520,468
Smoked:								
Chinook	50,000	5,000	56,550	8,943	4,000	700	110,550	14,643
Silver	3,000	300	4,660	326			7,660	626
Total	53,000	5,300	61,210	9,269	4,000	700	118,210	15,269
Grand total	117,000	11,700	4,156,372	459,288	732,800	64,749	5,006,172	535,737

ALASKA.

The season of 1909 was a very quiet one in Alaska. Owing to the expected quadrennial heavy run of sockeye salmon on Puget Sound, several cannery men who operate there and in Alaska shut down their Alaska plants and devoted all their energies to the Sound, which materially reduced the amount of fishing gear used in Alaska, and as a consequence the total quantity of products produced. In western Alaska the ice hampered operations in the early part of the season, but, with the exception of the Ugashik and Ugaguk Rivers, the runs were fairly good. The weather was very severe on Nushagak Bay and as a result eight fishermen lost their lives there by drowning. In Central Alaska the run of salmon in the neighborhood of Karluk fell off very materially as compared with 1908, but in Chignik the usual good run appeared. In southeast Alaska, except in the lower portion, the run was very good, but the cannery men packed no more of the cheaper grades than they felt could be disposed of at the then unremunerative prices prevailing.

Persons engaged.—The total number of persons engaged in the Alaska salmon fisheries was 11,433. Western Alaska leads in the total number, followed by southeast and central Alaska in the order named. A large number of Indians are employed in this industry.

PERSONS ENGAGED IN THE ALASKA SALMON FISHERIES IN 1909.

Occupation and race.	Southeast Alaska.	Central Alaska.	Western Alaska.	Total.
Fishermen:				
Whites	662	400	1,424	2,486
Indians	982	184	10	1,176
Japanese	13			13
Total	1,657	584	1,434	3,675
Shoresmen:				
Whites	442	277	1,192	1,911
Indians	815	124	307	1,246
Chinese	546	377	1,069	1,992
Japanese	348	356	1,432	2,136
Total	2,151	1,134	4,000	7,285
Transporters:				
Whites	148	108	187	443
Indians	13	17		30
Total	161	125	187	473
Total:				
Whites	1,252	785	2,803	4,840
Indians	1,810	325	317	2,452
Chinese	546	377	1,069	1,992
Japanese	361	356	1,432	2,149
Grand total	3,969	1,843	5,621	11,433

Investments, apparatus, etc.—The total investment amounted to $13,948,271. Gill nets predominate, while purse and haul seines and stationary traps are important.

INVESTMENT IN THE ALASKA SALMON FISHERIES IN 1909.

Items.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.	Number.	Value.
Transporting vessels:								
Power vessels	69	$263,256	25	$213,019	39	$591,669	133	$1,067,944
Tonnage	1,173		1,482		3,236		5,891	
Outfit		65,814		53,255		147,917		266,986
Sailing vessels	5	158,000	9	289,000	29	638,400	43	1,085,400
Tonnage	7,434		14,270		38,057		59,761	
Outfit		15,800		28,900		63,840		108,540
Power boats	11	11,760	4	8,400	2	4,680	17	24,840
Fishing boats, power	60	30,000					60	30,000
Fishing boats, sail and row	766	25,981	300	21,215	755	164,475	1,821	211,671
Scows and house boats	98	38,175	79	30,930	133	101,900	310	171,005
Pile drivers	13	34,405	15	29,850	15	26,300	43	90,555
Apparatus, shore fisheries:								
Haul seines	45	12,451	49	15,280			[a] 94	27,731
Purse seines	98	27,188					[b] 98	27,188
Gill nets, drift	256	34,030	57	11,020	896	66,706	[c] 1,209	111,756
Traps, stationary	36	79,700	20	29,450	17	21,644	73	130,794
Traps, floating	14	19,750	1	1,500			15	21,250
Lines		523						523
Spears	20	30					20	30
Shore and accessory property		1,788,902		1,200,716		2,611,641		5,601,259
Cash capital		2,223,493		890,531		1,856,775		4,970,799
Total		4,829,258		2,823,066		6,295,947		13,948,271

[a] Aggregate length of 30,430 yards.
[b] Aggregate length of 35,670 yards.
[c] Aggregate length of 301,480 yards.

Catch.—The total catch amounted to 175,934,060 pounds, valued at $1,333,344. Red or sockeye salmon comprise almost two-thirds of the total catch. As compared with 1908, the catch of all species, except king salmon, decreased very materially, due to causes described elsewhere.

CATCH, BY SPECIES AND APPARATUS, IN THE SALMON FISHERIES OF ALASKA IN 1909.

Apparatus and species.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
SEINES.								
Coho, or silver	991,062	$13,214	313,548	$2,090			1,304,610	$15.304
Dog, or chum	3,102,192	5,817					3,102,192	5,817
Humpback, or pink	22,288,020	55,720	510,196	957			22,798,216	56,677
King, or spring	6.446	193	85,954	195			92,400	388
Red, or sockeye	6,426,325	102,821	10,194,165	81,553			16,620,490	184,374
Total	32,814,045	177,765	11,103,863	84,795			43,917,908	262,560
TRAPS.								
Coho, or silver	673,278	8,977	539,508	3,597	59,580	$397	1,272,366	12,971
Dog, or chum	2,699,160	5,061			811,648	1,015	3,510,808	6,076
Humpback, or pink	14,515,760	36,289	14,960	28	60	1	14,530,780	36,318
King, or spring	112,354	3,371	981,904	2,232	68,112	155	1,162,370	5,758
Red, or sockeye	5,362,896	71,505	10,762,775	86,102	2,540,055	20,320	18,665,726	177,927
Total	23,363,448	125,203	12,299,147	91.959	3,479,455	21,888	39,142,050	239,050

CATCH, BY SPECIES AND APPARATUS, IN THE SALMON FISHERIES OF ALASKA IN 1909—Continued.

Apparatus and species.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
GILL NETS.								
Coho, or silver.....	473,070	$6,308	....	....	428,358	$6,010	901,428	$12,318
Dog, or chum......	72,328	136	....	....	2,770,720	3,554	2,843,048	3,690
Humpback, or pink.	509,688	1,274	....	....	127,244	796	636,932	2,070
King, or spring.....	1,510,498	45,315	397,298	$902	2,835,646	10,781	4,743,442	56,998
Red, or sockeye....	2,391,990	38,272	2,439,920	19,519	75,669,360	605,355	80,501,270	663,146
Total........	4,957,574	91,305	2,837,218	20,421	81,831,328	626,496	89,626,120	738,222
LINES.								
Coho, or silver.....	48,000	640	....	....	....	....	48,000	640
King, or spring.....	2,961,332	88,840	....	....	....	....	2,961,332	88,840
Steelhead trout.....	11,650	400	....	....	....	....	11,650	400
Total........	3,020,982	89,880	....	....	....	....	3,020,982	89,880
SPEARS.								
Red, or sockeye....	227,000	3,632	....	....	....	....	227,000	3,632
TOTAL.								
Coho, or silver.....	2,185,410	29,139	853,056	5,687	487,938	6,407	3,526,404	41,233
Dog, or chum......	5,873,680	11,014	....	....	3,582,368	4,569	9,456,048	15,583
Humpback, or pink.	37,313,468	93,283	525,156	985	127,304	797	37,965,928	95,065
King, or spring.....	4,590,630	137,719	1,465,156	3,329	2,903,758	10,936	8,959,544	151,984
Red, or sockeye....	14,408,211	216,230	23,396,860	187,174	78,209,415	625,675	116,014,486	1,029,079
Steelhead trout.....	11,650	400	....	....	....	....	11,650	400
Grand total..	64,383,049	487,785	26,240,228	197,175	85,310,783	648,384	175,934,060	1,333,344

Products canned.—The total canned pack amounted to 2,403,669 pound and half-pound cases, valued at $9,438,152. More than two-thirds of the pack was composed of red salmon. Three canneries were not operated, which very materially reduced the size of the pack.

OUTPUT OF SALMON FROM THE CANNERIES IN ALASKA IN 1909, BY SPECIES AND SIZE OF CANS.[a]

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
Coho, or silver:								
1-pound flat......	1,206	$5,543	....	....	....	....	1,206	$5,543
1-pound tall......	38,714	155,431	10,275	$43,155	6,361	$26,900	55,350	225,486
Total..........	39,920	160,974	10,275	43,155	6,361	26,900	56,556	231,029
Dog, or chum:								
1-pound tall......	83,001	186,454	....	....	37,711	87,656	120,712	274,110
Humpback, or pink:								
1-pound tall......	455,999	1,092,389	5,581	13,394	3,293	9,056	464,873	1,114,839
King, or spring:								
1-pound tall......	857	3,598	16,913	74,418	30,264	129,608	48,034	207,624
Red, or sockeye:								
½-pound flat......	14,898	58,535	....	....	1,487	5,353	16,385	63,888
1-pound flat......	80,200	209,962	2,936	15,539	2,057	11,108	85,193	236,609
1-pound tall......	185,444	825,926	355,349	1,625,371	1,071,123	4,858,756	1,611,916	7,310,053
Total..........	280,542	1,094,423	358,285	1,640,910	1,074,667	4,875,217	1,713,494	7,610,550
Grand total....	860,319	2,537,838	391,054	1,771,877	1,152,296	5,128,437	2,403,669	9,438,152

[a] All 1-pound cases contain forty-eight 1-pound cans; the ½-pound cases contain forty-eight ½-pound cans. Reduced to a common basis of cases containing forty-eight 1-pound cans the pack is 2,395,477½ cases.

Miscellaneous products.—The total miscellaneous products prepared amounted to 9,473,005 pounds, valued at $374,324. Owing to the low prices prevailing for pickled salmon, the pack of such very materially declined. Restrictive regulations in regard to the pickling of salmon bellies also aided in reducing the pack. The mild-cured pack shows a gratifying increase over 1908.

MISCELLANEOUS SECONDARY SALMON PRODUCTS PREPARED IN ALASKA IN 1909.

Products.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Frozen:								
Coho, or silver	35,721	$1,072					35,721	$1,072
Dog, or chum	77,882	1,558					77,882	1,558
Steelhead trout	9,450	473					9,450	473
Total	123,053	3,103					123,053	3,103
Mild-cured:								
King, or spring	1,833,600	149,300					1,833,600	149,300
Pickled:								
Coho, or silver	40,400	1,405	17,800	$810	5,400	$270	63,600	2,485
Coho bellies			227,750	3,843			227,750	3,843
Dog, or chum	3,000	90			4,000	100	7,000	190
Humpback	311,400	9,405					311,400	9,405
Humpback backs	11,200	224					11,200	224
Humpback bellies	123,480	6,896	46,000	500			169,480	7,396
King, or spring	6,200	248			82,000	3,550	88,200	3,798
King bellies	7,000	175					7,000	175
Red, or sockeye			437,800	17,319	4,863,700	149,979	5,301,500	167,298
Redbellies			783,600	13,902			783,600	13,902
Total	502,680	18,443	1,512,950	36,374	4,955,100	153,899	6,970,730	208,716
Dry-salted and dried:								
Coho backs			14,500	549			14,500	549
Dog	71,600	1,038					71,600	1,038
Humpback backs	50,000	500	1,500	45			51,500	545
King	800	45					800	45
Redbacks			83,000	2,302			83,000	2,302
Total	122,400	1,583	99,000	2,896			221,400	4,479
Smoked:								
Coho backs			4,000	400			4,000	400
Dog	585	43					585	43
Redbacks			28,300	1,580	12,000	1,200	40,300	2,780
Total	585	43	32,300	1,980	12,000	1,200	44,885	3,223
Fertilizer	159,224	2,287					159,224	2,287
Oil	120,113	3,216					[a] 120,113	3,216
Grand total	2,862,202	177,975	1,644,250	41,250	4,967,100	155,099	9,473,005	374,324

[a] Represents 16,015 gallons.

As the fisheries of Alaska are carried on almost wholly in innumerable bays, straits, and sounds, but little being done in the rivers, it does not seem desirable to show them by waters, owing to the amount of space required for the tables.

BRITISH COLUMBIA.

The canned salmon pack of British Columbia was the only branch of the salmon industry of the Province which could be shown by species. Owing to the quadrennially heavy run occurring in the Fraser River in 1909, the pack of British Columbia is quite large. The pack is shown by water areas.

PACK OF CANNED SALMON IN BRITISH COLUMBIA, CANADA, IN 1909.

Species.	Fraser River.		Skeena River.		Rivers Inlet.		Nass River.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
Coho, or silver:								
½-pound flat	710	$1,988	1,158	$3,242	264	$739	....	....
1-pound flat	5,735	27,528	....	....	176	845	....	....
1-pound tall	15,459	64,928	11,671	49,034	1,092	4,586	6,818	$28,636
Total	21,904	94,444	12,829	52,276	1,532	6,170	6,818	28,636
Dogs, or chums:								
1-pound tall	725	1,740	12,000	28,800	....	....	....	....
Humpback, or pink:								
1-pound flat	227	624	40	110	....	....	....	....
1-pound tall	1,053	2,527	16,080	38,640	....	....	3,589	8,614
Total	1,280	3,151	16,120	38,750	....	....	3,589	8,614
King, or spring:								
½-pound flat	....	....	....	....	304	1,216	56	224
1-pound flat	1,167	7,032	....	....	47	282	....	....
½-pound tall	176	516	....	....	....	....	....	....
1-pound tall	173	934	12,025	64,935	388	1,095	2,309	12,469
1-pound oval	....	....	444	2,886	....	....	....	....
Total	1,516	8,482	12,469	67,821	739	2,593	2,365	12,693
Sockeye, or red:								
½-pound flat	309,634	1,238,536	72,838	291,352	51,520	206,080	11,162	44,648
1-pound flat	243,697	1,462,182	19,789	118,734	28,750	172,500	2,070	12,420
½-pound tall	....	....	2,600	8,580	10,280	33,924	....	....
1-pound tall	126,597	683,624	30,393	164,122	29,377	158,636	20,189	109,021
½-pound oval	17,650	75,013	....	....	....	....	....	....
1-pound oval	....	....	....	....	....	....	406	2,639
1-pound squats	8,312	49,872	....	....	....	....	....	....
Total	705,890	3,509,227	125,620	582,788	119,927	571,140	33,827	168,728
Grand total	731,315	3,617,044	181,038	770,435	122,198	579,903	46,599	218,671

PACK OF CANNED SALMON IN BRITISH COLUMBIA, CANADA, IN 1909—Continued.

Species.	Northern miscellaneous waters.		Vancouver Island.		Total.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.
Coho, or silver:						
½-pound flat					2,132	$5,969
1-pound flat					5,911	28,373
1-pound tall	13,071	$54,898	13,409	$56,318	61,520	258,400
Total	13,071	54,898	13,409	56,318	69,563	292,742
Dogs, or chums:						
1-pound tall	1,568	3,763	2,280	5,472	16,573	39,775
Humpback, or pink:						
1-pound flat			2,000	5,500	2,267	6,234
1-pound tall	3,000	7,200	4,000	9,600	27,722	66,581
Total	3,000	7,200	4,000	15,100	29,989	72,815
King, or spring:						
½-pound flat					360	1,440
1-pound flat					1,214	7,314
½-pound tall					176	516
1-pound tall	2,218	11,977	500	2,700	17,613	94,110
1-pound oval					444	2,886
Total	2,218	11,977	500	2,700	19,807	106,266
Sockeye, or red:						
½-pound flat	18,806	75,224	19,800	79,200	483,760	1,935,040
1-pound flat			20,400	122,400	314,706	1,888,236
½-pound tall					12,880	42,504
1-pound tall	29,694	160,348	41,643	224,872	277,893	1,500,623
½-pound oval					17,650	75,013
1-pound oval					406	2,639
1-pound squats					8,312	49,872
Total	48,500	235,572	81,843	426,472	1,115,607	5,493,927
Grand total	68,357	313,410	102,032	506,062	[a] 1,251,539	6,005,525

[a] All pound cases contain forty-eight 1-pound cans; the ½-pound cases contain forty-eight ½-pound cans. Reduced to a common basis of cases containing forty-eight 1-pound cans the pack is 993,060 cases.

VIII. STATISTICAL DATA FOR OTHER YEARS.

CANNING INDUSTRY OF PACIFIC COAST FROM 1864 TO 1910.

From the beginning of the canning of salmon on this coast it has been the most important branch of the industry, and the table below shows in condensed form the number of cases packed in each year on the Pacific coast of North America from the beginning of the industry in 1864 to 1910.

As British Columbia is a Province of the Dominion of Canada it does not come strictly within the scope of this report, but in order to show the pack of canned salmon on the North American shores of the Pacific Ocean, which would be incomplete without that of the Province, it has been included also.

PACK OF CANNED SALMON ON THE PACIFIC COAST, BY YEARS AND WATERS.

Year.	Puget Sound.	Grays Harbor.	Willapa Harbor.	Columbia River.	Coastal streams of Oregon.	Smith River, Cal.
	Cases.	*Cases.*	*Cases.*	*Cases.*	*Cases.*	*Cases.*
1866	...	...	...	4,000	...	...
1867	...	...	...	18,000	...	...
1868	...	...	...	28,000	...	...
1869	...	...	...	100,000	...	...
1870	...	...	...	150,000	...	...
1871	...	...	...	200,000	...	...
1872	...	...	...	250,000	...	...
1873	...	...	...	250,000	...	...
1874	...	...	...	350,000	...	...
1875	...	...	...	375,000	...	...
1876	...	...	...	450,000	...	...
1877	5,500	...	...	380,000	7,804	...
1878	238	5,420	...	460,000	16,634	4,277
1879	1,300	...	...	480,000	8,571	...
1880	5,100	...	...	530,000	7,772	7,500
1881	8,500	...	...	550,000	12,320	...
1882	7,900	...	...	541,300	19,186	...
1883	1,500	...	...	629,400	16,156	...
1884	5,500	...	...	620,000	12,376	...
1885	12,000	...	...	553,800	9,310	...
1886	17,000	...	...	448,500	49,147	...
1887	22,000	...	...	356,000	73,996	...
1888	21,975	37,000	22,500	372,477	92,863	2,347
1889	11,674	...	...	309,885	98,800	...
1890	8,000	...	...	435,774	47,009	...
1891	20,529	500	8,000	398,953	24,500	...
1892	26,426	16,500	14,500	487,338	83,600	...
1893	89,774	22,000	16,195	415,876	52,778	1,500
1894	95,400	21,400	15,100	490,100	54,815	1,500
1895	179,968	11,449	22,600	634,696	77,878	2,250
1896	195,664	21,274	24,941	481,697	87,360	...
1897	494,026	13,300	29,600	552,721	60,158	...
1898	400,200	12,100	21,420	487,944	75,679	...
1899	919,611	24,240	21,314	332,774	82,041	...
1900	469,450	30,800	26,300	358,772	12,237	...
1901	1,380,590	41,500	34,000	390,183	58,618	...
1902	581,659	31,500	39,492	317,143	44,236	...
1903	478,488	...	5,890	339,577	54,861	...
1904	291,488	27,559	26,400	395,104	98,874	...
1905	1,018,641	22,050	14,950	397,273	89,055	...
1906	430,602	22,000	14,440	394,898	107,332	...
1907	698,080	14,000	13,382	324,171	79,712	...
1908	448,765	14,000	20,457	253,341	52,478	...
1909	1,632,949	19,787	12,024	274,087	58,169	...
1910	567,883	51,130	14,508	391,415	103,617	...
Total	10,548,380	459,509	418,013	16,960,199	1,829,942	19,374

PACK OF CANNED SALMON ON THE PACIFIC COAST, BY YEARS AND WATERS—Con

Year.	Klamath River, Cal.	Eel River, Cal.	Sacramento River.	Alaska.	British Columbia.	Total.
	Cases.	Cases.	Cases.	Cases.	Cases.	Cases.[a]
1864			2,000			2,000
1865			2,000			2,000
1866						4,000
1867						18,000
1868						28,000
1869						100,000
1870						150,000
1871						200,000
1872						250,000
1873						250,000
1874			2,500			352,500
1875			3,000			378,000
1876			10,000		7,247	467,247
1877		8,500	21,500		58,387	481,691
1878		10,500	34,017	8,159	89,946	629,191
1879			13,855	12,530	61,093	577,349
1880		6,250	62,000	6,539	61,849	687,010
1881			181,200	8,977	169,576	930,573
1882			200,000	21,745	240,461	1,030,592
1883			123,000	48,337	163,438	981,831
1884			81,450	64,886	123,706	907,918
1885			90,000	83,415	108,517	857,042
1886			39,300	142,065	152,964	848,976
1887			36,500	206,677	204,083	899,256
1888	4,400		68,075	412,115	184,040	1,217,792
1889			57,300	719,196	417,211	1,614,066
1890			25,065	682,591	411,257	1,609,696
1891			10,353	801,400	314,511	1,578,746
1892			2,281	474,717	248,721	1,354,083
1893	1,600		23,336	643,654	610,202	1,876,915
1894	1,700		28,463	686,440	492,232	1,887,150
1895	1,600		25,185	626,530	587,692	2,169,848
1896			13,387	966,707	617,782	2,408,812
1897			38,543	909,078	1,027,183	3,124,609
1898			29,731	965,097	492,551	2,484,722
1899	1,600		32,580	1,078,146	765,519	3,257,825
1900			39,304	1,548,139	606,540	3,091,542
1901			17,500	2,016,804	1,247,212	5,186,407
1902	2,500		14,043	2,536,824	627,161	4,194,558
1903			8,200	2,246,210	473,847	3,607,073
1904	3,400		14,407	1,953,756	465,894	3,276,882
1905			2,780	1,894,516	1,167,822	4,607,087
1906				2,219,044	629,460	3,817,776
1907				2,169,873	547,459	3,522,506
1908				2,606,973	566,303	3,962,317
1909	5,633			2,395,477	993,060	5,393,670
1910	8,016	6,000		2,413,054	760,830	4,316,453
Total	30,449	31,250	1,352,855	33,569,671	15,695,756	80,593,711

[a] Reduced to a common basis of forty-eight 1-pound cans to the case.

CANNING INDUSTRY, BY SPECIES AND WATERS.

The tables below show separately, by waters and as far as possible by species, the salmon canned on the Pacific coast from the beginning of the industry until 1910. It is only within recent years that the published statistics have shown the pack of the different species separately. In the early years of canning, the chinook, or quinnat, salmon was used exclusively, the other species not being utilized until the chinook had begun to decrease in abundance, or a demand had arisen for a cheaper product. There is a very great difference in the selling value of the highest and lowest grades, and it is necessary to have complete statistical data now in order intelligently to comprehend the trend of the industry. While every effort has been made to make these tables complete, there are, unfortunately, some gaps which it was found impossible to fill.

PACK OF CANNED SALMON ON PUGET SOUND FROM 1877 TO 1910.

Year.	Number of canneries.	Chinook.		Blueback.		Silver.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.
1877	1					5,000	
1878	1					238	
1879	1					1,300	$5,690
1880	1						
1881	1						
1882	1						
1883	1						
1884	1						
1885							
1886							
1887							
1888	4						
1889	2	240	$1,200			7,480	37,400
1890	1	1,000	5,000			3,000	15,000
1891	2	382	2,101	5,538	$24,921	5,869	19,368
1892	2	86	473	2,954	11,816	7,206	24,500
1893	3	1,200	6,480	47,852	103,371	11,812	59,060
1894	3			41,781	188,014	22,418	89,672
1895	7	1,542	7,325	65,143	273,108	50,865	154,218
1896	11	13,495	67,475	72,979	350,299	82,640	264,448
1897	12	9,500	39,045	312,048	1,248,192	91,900	282,133
1898	18	11,200	50,624	252,000	1,058,400	98,600	335,240
1899	19	24,364	103,180	499,646	2,368,334	111,387	418,176
1900	19	22,350	134,100	229,800	1,149,000	128,200	512,800
1901							
1902	21	30,049	150,245	372,301	2,047,655	85,817	429,085
1903	22	14,500	72,500	167,211	1,003,260	103,450	413,800
1904	13	14,441	69,352	109,264	653,871	118,127	447,851
1905	24	1,804	9,922	825,453	4,952,718	79,335	337,174
1906	16	8,139	48,834	178,748	1,251,236	94,497	472,485
1907	14	1,814	16,326	93,122	698,416	119,472	476,288
1908	11	95,210	666,470	170,951	1,196,657	128,922	644,922
1909	24	13,019	72,604	1,097,904	6,183,300	143,133	630,446
1910	15	10,064	60,324	248,014	1,673,095	162,755	895,153

PACK OF CANNED SALMON ON PUGET SOUND FROM 1877 TO 1910—Continued.

Year.	Number of canneries.	Dog. Cases.	Dog. Value.	Humpback. Cases.	Humpback. Value.	Total. Cases.	Total. Value.
1877	1			500		5,500	
1878	1					238	
1879	1					1,300	$5,690
1880	1					5,100	
1881	1					8,500	
1882	1					7,900	
1883	1					1,500	
1884	1					5,500	
1885						12,000	
1886						17,000	
1887						22,000	
1888	4					21,975	126,356
1889	2	1,145	$3,435	2,809	$7,584	11,674	49,619
1890	1	4,000	12,000			8,000	32,000
1891	2	3,093	10,825	5,647	15,246	20,529	72,461
1892	2	16,180	56,630			26,426	93,419
1893	3	11,380	31,295	17,530	47,331	89,774	247,537
1894	3	22,152	60,918	9,049	24,432	95,400	363,036
1895	7	38,785	94,741	23,633	62,556	179,968	591,948
1896	11	26,550	73,013			195,664	755,235
1897	12	23,310	64,103	57,268	171,804	494,026	1,805,277
1898	18	38,400	105,600			400,200	1,549,864
1899	19	31,481	86,427	252,733	734,241	919,611	3,710,358
1900	19	89,100	245,025			469,450	1,940,925
1901						1,380,590	
1902	21	93,492	467,460			581,659	3,094,445
1903	22	12,001	30,002	181,326	407 984	478,488	1,927,546
1904	13	49,656	124,254			291,488	1,295,328
1905	24	41,057	102,643	70,992	212,976	1,018,641	5,615,433
1906	16	149,218	708,781			430,602	2,481,336
1907	14	50,249	150,847	433,423	1,300,269	698,080	2,642,146
1908	11	47,607	142,821	6,075	18,225	448,765	2,669,095
1909	24	53,688	128,916	370,993	902,342	1,632,949	7,917,608
1910	15	146,942	514,297	108	388	567,883	3,143,256

PACK OF CANNED SALMON ON GRAYS HARBOR FROM 1878 TO 1910.

Year.	Number of canneries.	Chinook. Cases.	Chinook. Value.	Silver. Cases.	Silver. Value.	Dog or chum. Cases.	Dog or chum. Value.	Total. Cases.	Total. Value.
1878	1							5,420	$29,268
1879	1								
1880									
1881									
1882									
1883									
1884									
1885									
1886									
1887									
1888	4							37,000	$212,750
1889									
1890									
1891	1			500	$1,500			500	1,500
1892	1	4,500	$15,390	9,000	30,780	3,000	$9,415	16,500	55,585
1893	1	4,500	22,500	12,000	48,000	5,500	14,850	22,000	85,350
1894	1	12,300	61,500	4,100	16,400	5,000	13,500	21,400	91,400
1895	1	56	202	8,876	28,403	2,517	6,922	11,449	35,527
1896	2	7,816	36,806	9,278	29,689	4,180	11,495	21,274	57,990
1897	1	3,100	11,741	8,300	23,481	1,900	5,000	13,300	40,222
1898	2	5,100	23,052	4,800	16,320	2,200	6,050	12,100	45,422
1899	1	5,000	21,250	15,740	59,025	3,500	8,750	24,240	89,025
1900	2	6,700	33,500	12,900	51,600	11,200	30,800	30,800	115,900
1901								41,500	
1902	1	4,000	20,000	10,000	45,000	17,500	70,000	31,500	135,000
1903									
1904	2	4,339	20,163	14,904	51,854	8,316	21,022	27,559	93,039
1905	2	2,050	9,225	13,000	52,000	7,000	18,200	22,050	79,425
1906	2	2,500	10,000	11,500	43,900	8,000	21,500	22,000	75,400
1907	1	1,000	7,000	9,500	47,500	3,500	11,500	14,000	66,000
1908	1	1,000	7,000	9,500	47,500	3,500	11,500	14,000	66,000
1909	1	5,721	20,819	9,019	38,146	5,047	11.608	[a] 19,787	70,573
1910	3	15,495	90,718	21,768	108,840	13,867	48,534	[b] 51,130	248,092

[a] Also 1,649 cases, valued at $9,051, with sockeyes brought from Puget Sound.
[b] Also 4,350 cases of "Quiniault," or sockeye salmon.

PACK OF CANNED SALMON ON WILLAPA HARBOR FROM 1887 TO 1910.

Year.	Number of canneries.	Chinook or Black.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1887	4	...	...	...	...	...	...	...	...
1888	3	...	...	...	...	...	...	22,500	$129,375
1889	...	...	...	...	...	...	...	...	...
1890	...	...	...	...	...	...	...	...	...
1891	1	...	...	8,000	$24,000	...	...	8,000	24,000
1892	1	3,000	$10,260	9,000	30,780	2,500	$7,745	14,500	48,785
1893	1	1,700	9,180	7,895	31,580	6,600	18,150	16,195	58,910
1894	1	2,700	14,580	5,600	22,400	6,800	18,700	15,100	55,680
1895	2	4,636	23,180	13,047	41,150	4,917	13,222	22,600	77,552
1896	2	4,551	22,755	11,940	38,208	8,450	21,238	24,941	82,201
1897	1	8,100	33,291	14,600	44,822	6,900	18,975	29,600	97,088
1898	2	5,865	26,510	9,809	33,351	5,746	15,802	21,420	75,663
1899	3	5,650	25,425	10,675	40,031	4,989	13,720	21,314	79,176
1900	3	6,700	33,500	12,400	49,600	7,200	19,800	26,300	102,900
1901	...	...	...	...	...	...	...	34,000	...
1902	2	5,836	29,180	9,128	41,076	24,528	97,112	39,492	167,368
1903	1	2,300	13,800	2,390	10,755	1,200	3,300	5,890	27,855
1904	2	3,000	12,000	7,400	28,440	16,000	38,700	26,400	79,140
1905	2	4,650	20,925	4,300	17,200	6,000	15,000	14,950	53,125
1906	2	4,000	16,000	5,340	21,360	5,100	13,260	14,440	50,620
1907	2	3,530	15,354	9,228	36,682	624	2,496	13,382	54,532
1908	2	4,017	20,585	5,923	23,692	10,517	36,809	20,457	81,086
1909	1	1,455	5,869	4,822	17,359	5,747	13,163	12,024	36,391
1910	1	2,923	15,077	5,096	25,480	3,489	22,711	14,508	63,268

PACK OF CANNED SALMON ON THE COLUMBIA RIVER FROM THE INCEPTION OF THE INDUSTRY TO 1910.

Year.	Number of canneries.	Chinook.		Blueback.		Silversides.		Dog or chum.		Steelhead trout.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1866												4,000	$64,000
1867												18,000	288,000
1868												28,000	392,000
1869												100,000	1,350,000
1870												150,000	1,800,000
1871												200,000	2,100,000
1872												250,000	2,325,000
1873												250,000	2,250,000
1874												350,000	2,625,000
1875												375,000	2,250,000
1876												450,000	2,475,000
1877												380,000	2,052,000
1878	30											460,000	2,300,000
1879	30											480,000	2,640,000
1880	29											530,000	2,650,000
1881												550,000	2,475,000
1882												541,300	2,600,000
1883												629,400	3,147,000
1884												620,000	2,915,000
1885												553,800	2,500,000
1886												448,500	2,135,000
1887												356,000	2,124,000
1888	28											372,477	2,234,862
1889	21	266,697	$1,600,182	17,797	$101,051					25,391	$108,587	309,885	1,809,820
1890	21	335,604	1,946,087	57,345	290,069					42,825	171,300	435,774	2,407,456
1891	22	353,907	2,038,566	15,482	284,242					29,564	118,156	398,953	2,440,964
1892	24	344,267	1,996,388	66,547	372,909	4,176	$20,880			72,348	288,892	487,338	2,679,069
1893	24	288,773	1,559,374	30,459	152,295	29,107	116,428	2,311	$6,933	65,226	260,904	415,876	2,095,934
1894	24	351,106	1,895,976	43,814	224,430	42,758	171,032			52,422	209,688	490,100	2,501,126
1895	24	444,909	2,428,658	18,015	86,523	99,601	329,683	22,493	62,591	49,678	203,542	634,696	3,110,997
1896	24	370,943	1,840,511	16,983	81,518	44,108	141,145			49,663	198,652	481,697	2,261,826
1897	22	432,753	1,804,221	12,972	51,888	60,850	197,762			46,146	165,440	552,721	2,219,311
1898	23	329,566	1,490,394	66,670	300,015	65,431	222,465			26,277	60,352	487,944	2,073,226
1899	17	255,824	1,458,175	23,969	134,723	29,608	112,055	11,379	33,836	11,994	39,186	332,774	1,777,975
1900	16	262,392	1,821,258	13,162	92,184	44,925	202,163	17,696	63,706	20,597	102,985	358,772	2,282,296
1901												390,183	1,942,660
1902	14	270,580	1,428,743	17,037	86,465	10,532	44,732	10,401	41,604	8,593	42,965	317,143	1,644,509
1903	16	301,762	1,610,614	8,383	42,867	12,181	49,869	10,000	37,500	7,251	36,255	339,577	1,777,105
1904	20	320,378	1,944,690	12,911	78,048	31,254	118,357	20,693	52,691	9,868	48,892	395,104	2,242,678

1905	19	327,106	1,962,636	7,768	46,608	26,826	114,011	25,751	65,206	9,822	$49,110	397,273	2,237,571
1906	19	311,334	1,868,007	7,816	54,712	41,446	124,338	27,802	69,505	6,500	32,500	394,898	2,149,062
1907	19	258,433	....	5,504	....	31,757	....	22,556	....	5,921	....	324,171	1,763,490
1908	14	210,096	....	8,581	....	31,432	....	16,884	....	10,726	....	253,341	1,380,708
1909	15	162,131	1,203,546	[a] 27,908	214,561	42,178	185,070	24,542	57,115	17,382	99,796	[b] 274,087	1,760,088
1910	15	244,285	1,882,137	6,234	34,287	68,922	363,688	66,538	232,883	5,436	31,203	391,415	2,544,198
Total	....	....	....	....	....	....	....	....	....	....	....	16,960,199	94,792,931

[a] Of these, 2,846 cases, valued at $23,203, were packed with sockeyes brought from Puget Sound.
[b] 55 cases of humpbacks, valued at $132, were also packed with humpbacks brought from Puget Sound.

PACK OF CANNED SALMON ON THE NEHALEM RIVER, OREG., FROM 1887 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1887	1	...	...	...	...	...	...	5,000	$30,000
1888	...	...	...	...	...	...	...	...	...
1889	...	...	...	...	...	...	...	6,000	32,000
1890	...	...	...	...	...	...	...	9,000	45,500
1891	1	...	...	...	...	...	...	3,500	14,000
1892	1	...	...	10,000	$40,000	...	...	10,000	40,000
1893	1	1,692	$6,768	5,031	20,124	...	...	6,723	26,892
1894	1	1,627	6,508	4,866	19,464	...	...	6,493	25,972
1895	1	1,752	7,008	5,152	16,486	...	...	6,904	23,494
1896	1	2,828	8,484	5,218	15,654	...	...	8,046	24,138
1897	2	3,384	10,152	8,366	25,098	...	...	11,750	35,250
1898	1	3,808	9,891	5,700	19,380	...	...	9,508	29,271
1899	1	1,384	5,536	7,405	26,658	1,288	$3,864	10,077	36,058
1900	1	...	...	...	...	...	...	...	...
1901	1	268	1,139	3,273	13,092	2,669	7,206	6,210	21,437
1902	1	271	1,431	3,169	13,468	2,570	10,280	6,010	25,179
1903	1	686	3,670	4,615	19,614	...	...	5,301	...
1904	1	500	2,500	5,000	20,000	6,000	12,000	11,500	34,500
1905	...	2,700	16,200	2,900	12,325	6,000	15,000	11,600	43,525
1906	1	3,987	23,922	4,976	14,928	2,057	5,143	11,020	42,993
1907	1	4,000	...	6,600	...	2,000	...	12,600	...
1908	1	5,000	...	6,100	...	2,016	...	...	...
1909	1	1,985	10,542	4,554	20,253	909	2,091	7,448	32,886
1910	1	3,500	...	5,400	...	1,500	...	10,400	...

PACK OF CANNED SALMON ON TILLAMOOK BAY, OREG., FROM 1886 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1886	2	...	...	...	...	...	...	37,000	...
1887	2	...	...	...	...	...	...	21,000	$115,500
1888	2	...	...	...	...	...	...	14,633	84,140
1889	...	...	...	...	...	...	...	9,500	52,250
1890	...	...	...	...	...	...	...	14,009	79,049
1891	1	...	...	...	...	...	...	...	...
1892	1	...	...	18,000	$72,000	...	...	18,000	72,000
1893	1	497	$1,988	4,000	16,000	6,919	$17,297	11,416	35,285
1894	1	700	2,800	7,763	31,052	700	1,750	9,163	35,602
1895	1	...	...	6,514	20,845	7,001	19,253	13,515	40,098
1896	1	2,200	6,600	4,860	14,580	...	...	7,060	21,180
1897	1	2,000	6,000	9,000	27,000	...	...	11,000	33,000
1898	1	5,000	13,000	10,342	35,162	...	...	15,342	48,162
1899	1	2,180	8,720	3,889	14,036	5,121	15,363	11,190	38,119
1900	1	...	...	...	...	...	...	...	...
1901	1	848	4,240	2,133	9,598	3,901	10,728	6,882	24,566
1902	1	215	1,135	2,287	9,720	4,093	16,372	6,595	27,227
1903	1	...	...	2,727	11,590	2,620	10,480	5,347	22,070
1904	1	...	...	4,400	17,600	6,500	13,000	10,900	30,600
1905	1	1,100	6,600	1,700	7,650	8,800	22,000	11,600	36,250
1906	1	1,870	11,220	2,364	7,092	1,270	3,175	5,504	21,487
1907	1	2,000	...	3,410	...	2,314	...	7,724	...
1908	1	2,300	...	6,000	...	4,000	...	...	...
1909	1	2,615	15,663	5,029	21,809	3,712	8,538	11,356	46,010
1910	1	2,900	...	4,500	...	2,000	...	9,400	...

PACK OF CANNED SALMON ON NESTUCCA RIVER, OREG., FROM 1887 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1887	1							4,300	$23,650
1888	1							5,000	28,750
1889								6,700	36,850
1890									
1891	1								
1892									
1893									
1894									
1895									
1896									
1897									
1898									
1899	1	1,109	$4,436	3,034	$10,922	513	$1,539	4,656	16,897
1900	1								
1901	1	279	1,116	3,553	13,323	396	1,089	4,228	15,528
1902									
1903									
1904									
1905	1	3,000	18,000	1,000	4,250	400	1,000	4,400	23,250
1906	1	2,622	15,732	2,468	7,404	165	413	5,255	23,549
1907	1	2,100		3,540		150		5,790	
1908	1	2,000		3,000		100			
1909									
1910	1	2,000		3,300		140		5,440	

PACK OF CANNED SALMON ON SILETZ RIVER, OREG., FROM 1896 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1896	1	2,500	$7,500	1,900	$5,700			4,400	$13,200
1897	1	3,510	10,530	5,015	15,045			8,525	25,575
1898	1	3,200	8,360	4,330	14,722			7,530	23,082
1899	1	2,200	9,900	2,319	8,696	200	$550	4,719	19,146
1900	1								
1901	1	876	4,380	3,740	16,830	360	1,260	4,976	22,470
1902	1	600	3,168	1,917	8,147	500	2,000	3,017	13,315
1903									
1904	1	1,000	5,000	3,300	13,200	1,000	2,000	5,300	20,200
1905	1	1,500	9,000	1,700	7,225	900	2,250	4,100	18,475
1906	1	2,635	15,810	3,192	9,576	167	418	5,994	25,804
1907	1	2,333		4,300		200		6,833	
1908	1	2,100		4,700		300		7,100	
1909									
1910	1	2,200		4,600		250		7,050	

PACK OF CANNED SALMON ON YAQUINA BAY AND RIVER, OREG., FROM 1887 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1887	2	...	...	...	...	...	...	...	...
1888	3	...	...	...	...	...	...	5,088	$29,256
1889	...	...	...	...	...	...	...	5,000	27,500
1890	...	...	...	...	...	...	...	...	...
1891	1	...	...	...	...	...	...	...	...
1892	...	...	...	...	...	...	...	...	...
1893	...	...	...	...	...	...	...	...	...
1894	...	...	...	...	...	...	...	...	...
1895	...	...	...	...	...	...	...	...	...
1896	1	1,714	$5,142	615	$1,845	...	...	2,329	6,987
1897	...	...	...	...	...	...	...	...	...
1898	1	170	442	1,530	5,202	...	...	1,700	5,644
1899	2	316	1,422	3,234	12,127	1,300	$3,575	4,850	17,124
1900	1	...	...	...	...	...	...	...	...
1901	1	96	480	2,848	12,816	549	1,647	3,493	14,943
1902	...	...	...	...	...	...	...	...	...
1903	1	...	...	1,238	5,262	315	787	1,553	6,049
1904	1	50	200	2,600	8,840	450	1,080	3,100	10,120
1905	1	200	1,200	2,050	8,613	62	155	2,312	9,968
1906	1	500	3,000	3,100	9,300	60	150	3,660	12,450
1907	1	834	...	1,000		49	...	1,883	...
1908	1	...	...	4,000	...		...	4,000	...
1909	1	...	...	1,139	4,556	33	76	1,172	4,632
1910	1	...	...	2,669	13,345	...	...	2,669	13,345

PACK OF CANNED SALMON ON ALSEA RIVER AND BAY, OREG., FROM 1886 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1886	1	...	...	...	...	...	...	...	...
1887	2	...	...	...	...	...	...	11,180	$64,285
1888	3	...	...	...	...	...	...	9,620	55,315
1889	...	...	...	...	...	...	...	10,000	55,000
1890	...	...	...	...	...	...	...	...	...
1891	1	...	...	...	...	...	...	...	...
1892	1	...	...	3,600	$14,400	...	...	3,600	14,400
1893	1	1,260	$6,300	3,240	12,960	...	...	4,500	19,260
1894	1	440	2,200	4,160	16,640	...	...	4,600	18,840
1895	1	1,700	6,375	3,280	11,808	...	...	4,980	18,183
1896	1	3,500	10,500	3,400	10,200	...	...	6,900	20,700
1897	1	1,800	5,400	3,200	9,600	...	...	5,000	15,000
1898	1	4,296	11,170	2,170	7,378	...	...	6,466	18,548
1899	1	2,150	9,138	5,010	19,038	...	...	7,160	28,176
1900	1	...	...	...	...	...	...	...	...
1901	1	695	3,475	4,629	18,790	891	$3,118	6,215	25,383
1902	1	701	3,702	4,530	19,253	670	2,680	5,901	25,635
1903	1	1,031	5,516	4,242	18,029	44	88	5,317	23,633
1904	1	1,000	5,000	6,500	26,000	300	600	7,800	31,600
1905	1	2,500	15,000	1,800	7,650	700	1,750	5,000	24,400
1906	1	3,702	22,212	3,843	11,529	...	...	7,545	33,741
1907	1	800	...	5,100	...	350	...	6,250	...
1908	1	1,200	...	6,000	...	400	...	7,600	...
1909	1	1,119	6,714	5,486	24,027	80	184	6,685	30,925
1910	1	2,500	...	5,900	...	100	...	8,500	...

PACK OF CANNED SALMON ON THE SIUSLAW RIVER, OREG., FROM 1878 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1878	2							10.300	$55,620
1879	2								
1880									
1881									
1882									
1883									
1884									
1885									
1886									
1887									
1888	1							11,960	68,770
1889	1							12,000	66,000
1890									
1891	2								
1892	2			18,000	$72,000			18,000	72,000
1893	2	1,471	$7,355	11,830	47,320			13,301	54,675
1894	2	1,871	9,355	14,987	59,948			16,858	69,303
1895	2	1,637	6,139	10,465	35,274			12,102	41,413
1896	1	2,700	8,100	9,000	27,000			11,700	35,100
1897	1	1,100	3,300	3,900	11,700			5,000	15,000
1898	1	850	2,210	10,000	34,000			10,850	36,210
1899	1	1,162	4,648	7,323	26,363	115	$345	8,600	31.356
1900	2								
1901	1	1,735	8,675	7,488	29,952			9,223	38,627
1902	1	1,288	6.800	4,320	18,260			5,608	25,060
1903	1	1,519	8,127	6,842	29,079			8,361	37,206
1904	1	500	2,500	6,500	26,000			7,000	28,500
1905	1								
1906	2	4,500	27,000	15,000	45,000	1,500	3,750	21,000	75,750
1907	1			15,773				15,773	
1908	1			8,600				8,600	
1909	2	632	3,792	7,436	32,956			8,068	36,748
1910	2	856		12,800		8,502		22,158	

PACK OF CANNED SALMON ON THE UMPQUA RIVER, OREG., FROM 1878 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Dog.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.	Cases.	Value.
1878	2							8,100	$43,740
1879	2								
1880									
1881									
1882									
1883									
1884	2								
1885	1								
1886	1								
1887	1							4,000	22,000
1888	1							9,000	51,750
1889	1							12,000	66,000
1890									
1891	1								
1892	1			10,000	$40,000			10,000	40,000
1893	1	809	$4,045	3,204	12,816			4,013	16,861
1894	1	235	1,175	6,875	27,500			7,110	28,675
1895	1	992	3,720	7,697	28,863			8,689	32,583
1896	1	1,300	3,900	8,000	24,000			9,300	27,900
1897									
1898									
1899	2	925	3,860	7,576	27,006	115	$345	8,616	31,211
1900	2								
1901									
1902									
1903	1	23	123	6,733	28,615			6,756	28,738
1904	1	500	2,500	9,500	38,000	500	1,000	10,500	41,500
1905	1	6,100	36,600	10,500	44,625			16,600	81,225
1906	1	1,143	6,858	5,613	16,839			6,756	23,697
1907									
1908									
1909	1	500	3,000	7,753	31,012			8,253	34,012
1910	1	2,000		11,000				13,000	

PACK OF CANNED SALMON ON COOS BAY AND RIVER, OREG., FROM 1887 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.
1887	2					11,300	$62,150
1888	1					5,500	31,625
1889	1					7,000	38,500
1890							
1891	2						
1892							
1893	1			3,125	$12,500	3,125	12,500
1894	1	163	$815	8,428	33,712	8,591	34,527
1895	1	5,110	19,163	2,332	8,934	7,442	28,097
1896	1	13,000	39,000	2,000	6,000	15,000	45,000
1897	1	6,200	18,600	2,200	6,600	8,400	25,200
1898	2	3,142	8,169	7,180	24,412	10,322	32,581
1899	2	1,273	5,092	5,174	18,626	6,447	23,718
1900	2						
1901	1	1,215	6,075	4,082	16,328	5,297	22,403
1902	1	412	2,175	2,640	11,220	3,052	13,395
1903							
1904	1	2,033	7,725	7,200	24,480	9,233	32,205
1905							
1906	1	2,043	12,258	1,755	5,265	3,798	17,523
1907							
1908							
1909	1	275	1,475	3,959	17,927	4,234	19,402
1910	1	500		5,500		6,000	

PACK OF CANNED SALMON ON THE COQUILLE RIVER, OREG., FROM 1883 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.
1883	1						
1884							
1885							
1886	2						
1887	3						
1888	2					11,000	$63,250
1889						8,600	47,300
1890							
1891	1						
1892	1			5,000	$20,000	5,000	20,000
1893	1			6,500	26,000	6,500	26,000
1894	a 1			2,000	8,000	2,000	8,000
1895	2	760	$2,887	8,724	32,615	9,484	35,502
1896	2	1,225	3,675	7,800	23,400	9,025	27,075
1897							
1898	2	541	1,407	7,485	25,499	8,026	26,906
1899	2	950	3,800	7,550	28,500	8,500	32,300
1900	1	2,636	13,180	9,601	38,404	12,237	51,584
1901	1	133	665	5,096	20,384	5,229	21,049
1902	1	286	1,510	5,877	24,927	6,163	26,437
1903	1	331	1,771	8,685	36,911	9,016	38,682
1904	2	600	2,400	13,686	54,744	14,286	57,144
1905	2	2,100	12,600	11,343	48,208	13,443	60,808
1906	2	821	4,926	17,979	53,937	18,800	58,863
1907	2	306		13,220		13,526	
1908	2			19,174		19,174	
1909	2	250	1,255	9,818	42,687	10,068	43,942
1910	2	420		16,637		17,057	

a Burned.

PACK OF CANNED SALMON ON ROGUE RIVER, OREG., FROM 1877 TO 1910.

Year.	Number of canneries.	Chinook.		Silver.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.
1877	1					7,804	
1878	1					8,534	
1879	1					8,571	
1880	1					7,772	
1881	1					12,320	
1882	1					19,186	
1883	1					16,156	
1884	1					12,376	
1885	1					9,310	
1886	1					12,147	
1887	1					17,216	
1888	1					21,062	$121,107
1889	1					22,000	132,000
1890	1					24,000	120,000
1891	1					21,000	105,000
1892	1	10,000	$59,000	9,000	$36,000	19,000	95,000
1893	[a] 1	3,200	16,000			3,200	16,000
1894	([b])						
1895	1	10,377	41,508	4,385	15,347	14,762	56,855
1896	1	15,000	75,000	3,000	9,000	18,000	84,000
1897	1	15,355	61,420	3,653	10,959	19,008	72,379
1898	1	12,964	51,550	501	1,303	13,465	52,853
1899	1	5,481	30,145	1,745	6,980	7,226	37,125
1900	1						
1901	1	2,681	13,405	4,184	17,736	6,865	31,141
1902	1	3,799	20,058	4,091	17,387	7,890	37,445
1903	1	8,418	45,036	4,792	20,366	13,210	65,402
1904	1	16,000	64,000	3,255	11,392	19,255	75,392
1905	1	18,500	111,000	1,500	6,375	20,000	117,375
1906	1	12,000	72,000	6,000	18,000	18,000	90,000
1907	1	7,537		1,796		9,333	
1908	1	4,354		2,650		6,004	
1909	1	186	1,300	699	2,977	885	4,277
1910	1	232		2,711		1,943	

[a] Burned down during season. [b] Not operated.

PACK OF CANNED SALMON ON SMITH RIVER, CAL., IN SPECIFIED YEARS.

Years.	Number of canneries.	Chinook salmon.		Silver salmon.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.
1878	1	4,277	$23,096			4,277	$23,096
1880	1	7,500				7,500	
1888	1	2,347	14,082			2,347	14,082
1893	1	1,500		500		2,000	
1894	1	1,500		500		2,000	
1895	1	2,250	9,990			2,250	9,990

PACK OF CANNED SALMON ON KLAMATH RIVER, CAL., IN SPECIFIED YEARS.

Year.	Number of canneries.	Chinook.		Silver.		Total.	
		Cases.	Value.	Cases.	Value.	Cases.	Value.
1888	1	4,400	$26,400			4,400	$26,400
1893	1	1,600				1,600	
1894	1	1,700				1,700	
1895	1	1,200	5,321	400	$1,500	1,600	6,821
1899	1	1,600	8,800			1,600	8,800
1902	1	2,500				2,500	
1904	1	3,400	18,360			3,400	18,360
1909	1	5,633	28,315			5,633	28,315
1910	1	8,016				8,016	

PACK OF CANNED SALMON ON EEL RIVER, CAL., IN SPECIFIED YEARS.

Year.	Number of canneries.	Chinooks.	
		Cases.	Value.
1877	1	8,500	$51,000
1878	1	10,500	56,700
1880	1	6,250	....
1910	1	6,000	....

PACK OF CANNED SALMON ON THE SACRAMENTO RIVER, FROM 1864 TO 1905.

Year.	Number of canneries.	Cases packed.[a]	Value.	Year.	Number of canneries.	Cases packed.[a]	Value.
1864	1	2,000	....	1886	....	39,300	....
1865	1	2,000	....	1887	....	36,500	....
1866	....	....	....	1888	6	68,075	$423,750
1867	....	....	....	1889	3	57,300	....
1868	....	....	....	1890	....	25,065	....
1869	....	....	....	1891	....	10,353	....
1870	....	....	....	1892	....	2,281	....
1871	....	....	....	1893	....	23,336	....
1872	....	....	....	1894	....	28,463	....
1873	....	....	....	1895	3	25,185	111,821
1874	....	2,500	....	1896	....	13,387	....
1875	....	3,000	....	1897	....	38,543	....
1876	2	10,000	....	1898	....	29,731	....
1877	....	21,500	....	1899	....	32,580	150,688
1878	6	34,017	$183,692	1900	....	39,304	....
1879	4	13,855	59,577	1901	....	17,500	....
1880	9	62,000	....	1902	....	14,043	....
1881	....	181,200	....	1903	....	8,200	....
1882	19	200,000	....	1904	2	14,407	66,936
1883	21	123,000	....	1905	1	2,780	....
1884	....	81,450	....				
1885	6	90,000	....	Total	....	1,352,855	....

[a] All were quinnat or chinook salmon.

PACK OF CANNED SALMON IN ALASKA, BY DISTRICTS, FROM THE INCEPTION OF THE INDUSTRY.

Year.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Canneries.	Pack.	Canneries.	Pack.	Canneries.	Pack.	Canneries.	Pack.
		Cases.		*Cases.*		*Cases.*		*Cases.*
1878	2	8,159	....	....	....	....	2	8,159
1879	2	12,530	....	....	....	....	2	12,530
1880	1	6,539	....	....	....	....	1	6,539
1881	1	8,977	....	....	....	....	1	8,977
1882	1	11,501	2	10,244	....	....	3	21,745
1883	4	20,040	2	28,297	....	....	6	48,337
1884	4	22,189	2	42,297	1	[a] 400	7	64,886
1885	3	16,728	2	52,687	1	14,000	6	83,415
1886	4	18,660	2	74,583	3	48,822	9	142,065
1887	5	31,462	2	102,515	3	72,700	10	206,677
1888	6	81,128	6	241,101	4	89,886	16	412,115
1889	12	141,760	21	461,451	4	115,985	37	719,196
1890	12	142,901	19	421,300	4	118,390	35	682,591
1891	11	156,615	14	511,367	5	133,418	30	801,400
1892	7	115,722	6	295,496	2	63,499	15	474,717
1893	8	136,053	11	399,815	3	107,786	22	643,654
1894	7	142,544	10	435,052	4	108,844	21	686,440
1895	7	148,476	10	327,919	6	150,135	23	626,530
1896	9	262,381	12	485,990	8	218,336	29	966,707
1897	9	271,867	13	382,899	7	254,312	29	909,078
1898	9	251,385	14	395,009	7	318,703	30	965,097
1899	9	310,219	14	356,095	9	411,832	32	1,078,146
1900	16	456,639	14	492,223	12	599,277	42	1,548,139

[a] Experimental pack.

PACK OF CANNED SALMON IN ALASKA, BY DISTRICTS, FROM THE INCEPTION OF THE INDUSTRY—Continued.

Year.	Southeast Alaska.		Central Alaska.		Western Alaska.		Total.	
	Canneries.	Pack.	Canneries.	Pack.	Canneries.	Pack	Canneries.	Pack.
		Cases.		*Cases.*		*Cases.*		*Cases.*
1901	21	735,449	13	562,142	21	719,213	55	2,016,804
1902	26	906,676	12	583,690	26	1,046,458	64	2,536,824
1903	21	642,305	12	417,175	27	1,186,730	60	2,246,210
1904	12	569,003	11	499,485	32	885,268	55	1,953,756
1905	13	433,607	9	371,755	25	1,089,154	47	1,894,516
1906	20	767,285	8	473,024	19	978,735	47	2,219,044
1907	22	887,503	8	522,836	18	759,534	48	2,169,873
1908	23	1,011,648	8	425,721	19	1,169,604	50	2,606,973
1909	19	852,870	8	391,054	18	1,151,553	45	2,395,477
1910	23	1,066,399	10	432,517	19	914,138	52	2,413,054
Total	....	10,647,220	....	10,195,739	....	12,726,712	....	33,569,671

PACK OF CANNED SALMON IN ALASKA FROM 1898 TO 1910, BY SPECIES.

Year.	Coho, or silver.		Dog, or chum.		Humpback, or pink.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.
1898	54,711	....	5,184	....	109,399	....
1899	39,402	....	1,931	....	149,159	....
1900	50,984	....	30,012	....	232,022	....
1901	65,509	....	47,464	....	541,427	....
1902	82,723	....	159,849	....	549,602	....
1903	120,506	....	35,052	....	355,799	....
1904	85,741	....	21,178	....	299,333	....
1905	67,394	$215,875	41,972	$113,056	168,597	$498,194
1906	109,141	382,109	254,812	730,235	348,297	1,046,951
1907	85,190	337,384	184,173	547,757	561,973	1,799,280
1908	68,827	274,089	218,513	554,197	644,133	1,733,379
1909	56,556	231,029	120,712	274,110	464,873	1,114,839
1910	114,026	559,666	254,218	773,409	554,322	1,764,055

Year.	King, or spring.		Red, or sockeye.		Total.	
	Cases.	Value.	Cases.	Value.	Cases.	Value.
1898	12,862	....	782,941	....	965,097	....
1899	23,400	....	864,254	....	1,078,146	....
1900	37,715	....	1,197,406	....	1,548,139	....
1901	43,069	....	1,319,335	....	2,016,804	....
1902	59,104	....	1,685,546	....	2,536,824	....
1903	47,609	....	1,687,244	....	2,246,210	....
1904	41,956	....	1,505,548	....	1,953,756	....
1905	42,125	$141,999	1,574,428	$5,335,547	1,894,516	$6,304,671
1906	30,834	116,222	1,475,961	5,620,875	2,219,044	7,896,392
1907	43,424	181,718	1,295,113	5,915,227	2,169,873	8,781,366
1908	23,730	99,867	1,651,770	7,524,251	2,606,973	10,185,783
1909	48,034	207,624	1,705,302	7,610,550	2,395,477	9,438,152
1910	40 221	214,802	1,450,267	7,774,390	2,413,054	11,086,322

Pack of Canned Salmon in British Columbia since the Inception of the Industry, by Waters.

Year.	Number of canneries.	Fraser River.	Skeena River.	Rivers inlet.	Nass River.	Vancouver Island.	Northern miscellaneous waters.	Total.
		Cases.	Cases.	Cases.	Cases.	Cases.	Cases.	Cases.
1876	2	7,247						7,247
1877	5	55,387	3,000					58,387
1878	8	81,446	8,500					89,946
1879	9	50,490	10,603					61,093
1880	9	42,155	19,694					61,849
1881	11	142,516	21,560			5,500		169,576
1882	16	199,204	24,522	5,635	6,500	4,600		240,461
1883	20	105,701	31,157	10,780	9,400	6,400		163,438
1884	14	34,037	53,786	20,383	8,500	7,000		123,706
1885	9	89,617	12,900			6,000		108,517
1886	16	99,177	37,587	15,000		1,200		152,964
1887	20	130,088	58,592	11,203		4,200		204,083
1888	21	76,616	70,106	20,000	12,318	5,000		184,040
1889	28	310,122	58,405	21,722	19,800	7,162		417,211
1890	33	244,352	91,645	33,500	24,700	11,060	6,000	411,257
1891	38	177,989	77,057	36,500	11,058	3,850	8,057	314,511
1892	36	98,491	90,750	14,955	26,100	4,300	14,125	248,721
1893	44	474,237	59,021	35,416	15,680	8,098	17,750	610,202
1894	42	363,566	61,005	40,161	20,000		7,500	492,232
1895	49	432,920	69,356	58,575	20,541	3,300	3,000	587,692
1896	56	375,344	97,863	107,473	14,649	7,903	14,550	617,782
1897	65	879,776	61,310	40,090	20,000	13,807	12,200	1,027,183
1898	67	264,225	80,102	105,362	20,000	12,539	10,323	492,551
1899	68	527,396	112,562	76,428	19,442	12,150	17,541	765,519
1900	69	331,371	135,424	74,196	20,200	17,102	28,247	606,540
1901	78	998,913	125,845	66,794	15,004	11,005	29,651	1,247,212
1902	69	327,197	155,936	70,298	23,212	16,432	34,086	627,161
1903	61	237,162	98,688	69,389	18,094	12,360	38,154	473,847
1904	51	128,903	154,869	94,292	29,587	14,888	43,355	465,894
1905	64	846,998	114,085	83,122	32,725	50,975	39,917	1,167,822
1906	59	226,744	162,420	122,878	32,534	40,511	44,343	629,460
1907	42	163,116	159,255	94,064	31,832	76,616	22,576	547,459
1908	50	89,184	209,177	75,090	46,908	83,918	62,026	566,303
1909		567,230	142,740	91,014	40,990	58,954	92,132	993,060
1910		223,148	222,035	129,398	39,720	53,964	92,565	760,830
Total		9,402,095	2,891,557	1,623,718	579,494	560,794	638,098	15,695,756

PICKLING INDUSTRY.

The salmon-pickling industry was so overshadowed by its giant brother, the canning industry, that statistical data, except for Alaska, were found in extremely fragmentary shape, and only that portion is shown relating to Alaska from the time of annexation to 1909.

Pack of Salted Salmon in Alaska, 1868 to 1909.

Year.	Salmon.		Salmon bellies.		Dry-salted salmon.	
	Barrels.	Value.	Barrels.	Value.	Pounds.	Value.
1868	2,000	$16,000				
1869	1,700	13,600				
1870	1,800	14,400				
1871	700	6,300				
1872	1,000	9,000				
1873	900	7,200				
1874	1,400	11,200				
1875	1,200	9,600				
1876	1,800	14,400				
1877	1,950	15,700				
1878	2,100	16,800				
1879	3,500	28,000				
1880	3,700	29,600	300	$3,300		
1881	1,760	15,840				
1882	5,890	53,010				

PACK OF SALTED SALMON IN ALASKA, 1868 TO 1909—Continued.

Year.	Salmon.		Salmon bellies.		Dry-salted salmon.	
	Barrels.	Value.	Barrels.	Value.	Pounds.	Value.
1883	7,251	$65,259				
1884	6,106	54,954				
1885	3,230	29,070				
1886	4,861	43,749				
1887	3,978	35,802				
1888	9,500	85,500				
1889	6,457	58,013				
1890	18,039	162,351				
1891	8,913	71,304				
1892	17,374	140,057	53	$815		
1893	24,005	120,083				
1894	32,011	176,060				
1895	14,234	85,404				
1896	9,314	65,198	150	1,200		
1897	15,848	110,936	2,846	28,460		
1898	22,670	181,360	580	5,800		
1899	22,382	167,865	235	2,350		
1900	31,852	238,890	2,353	23,530	511,400	$10,228
1901	24,477	171,339	652	3,816		
1902	30,384	212,688	328	2,952		
1903	27,921	223,368	3,667	32,973	300,000	5,500
1904	13,674	89,209	208	1,950	966,812	16,180
1905	19,071	143,811	1,360	11,355	7,280,234	115,643
1906	17,283	126,194	1,338	13,644	1,107,680	16,969
1907	22,307	203,127	2,965	37,422	107,580	1,505
1908	31,472	266,713	7,600	85,994	20,800	416
1909	28,443	183,400	1,970	25,358	71,600	1,038
1910	12,779	111,634	1,626	19,007	22,178	554
Total	517,236	3,883,988	28,231	299,926	10,388,284	168,033

MILD CURING INDUSTRY.

The beginning of this industry on the Pacific coast is of comparatively recent date, and the following table is complete, with the possible exception of a few tierces, which may not have been reported for the coastal rivers of Oregon:

NUMBER OF TIERCES OF MILD-CURED SALMON PACKED ON THE PACIFIC COAST FROM 1897 TO 1910.[a]

Year.	Alaska.	British Columbia.	Puget Sound, Wash.	Grays Harbor, Wash.	Willapa Harbor, Wash.	Columbia River, (both sides).	Coastal rivers, Oreg.	Eel River, Cal.	Sacramento River, Cal.	Monterey Bay, Cal.	Total.
1897						400					400
1898	70					700					770
1899	130			375		1,250					1,755
1900						1,275			950		2,225
1901	67		600			3,000			3,100		6,767
1902	67		425			4,213	188		2,325	504	7,722
1903	8		824			6,725			3,600	354	11,511
1904	34		1,250			9,088		200	4,719	248	15,539
1905	189	1,175	3,000			9,805	415		2,979	310	17,873
1906	1,126	957				8,000	740	175	2,177	510	13,685
1907	1,657	1,993	2,060	20	100	6,070	740	140	4,102	582	17,464
1908	1,378	1,060				4,960			3,243	252	10,893
1909	2,292	1,560	2,109	75	29	5,540	560	80	5,111	911	18,267
1910	3,357	1,638	2,435	67		7,922	1,398		5,516	75	22,408
Total	10,375	8,383	12,703	537	129	68,948	4,041	595	37,822	3,746	147,279

[a] The net weight of fish in a tierce is about 800 pounds. King, chinook, or spring salmon were used almost exclusively. From most places the data are complete from the time of the inception of the industry, but from a few minor places the data are somewhat fragmentary.

IX. TRADE WITH OUTLYING POSSESSIONS.

As a result of the war with Spain the United States in 1898 acquired possession of Porto Rico, Guam, and the Philippine Islands, while in the same year Hawaii became a part of this country at its own request, and in 1900 two islands of the Samoan group were acquired by a partition agreement with Great Britain and Germany. The trade with the Philippine Islands is shown to date in the tables of exports and imports to foreign countries, but the trade with the other possessions has been eliminated from these tables and shown separately ever since their annexation to the United States.

HAWAII.

The islands constituting this Territory, owing to their reciprocity treaty with this country for a number of years before annexation, purchased their supplies of salmon from the United States almost exclusively. In recent years the Territory has imported the following quantities of salmon from the mainland:

Year.	Canned.		All other, fresh or cured.
	Pounds.	Value.	*Value.*
1907	1,126,217	$89,286	$64,232
1908	965,029	89,025	67,143
1909	1,440,410	121,716	73,848
1910	1,381,398	113,526	72,194

PORTO RICO.

Of recent years, the following shipments of domestic salmon have been made to this island:

Year.	Canned.		All other, fresh or cured.
	Pounds.	Value.	*Value.*
1907	604,627	$53,916	$2,893
1908	512,038	48,195	1,428
1909	381,171	34,777	3,810
1910	511,055	43,494	6,243

GUAM.

Since annexation, this country and Japan have been competing for the trade of this island, which, in earlier years, Japan controlled quite largely. During the last two years, however, the United States has secured the advantage. The following table shows the extent of the trade, which is made up almost entirely of salted or pickled salmon:

Year and country.	Pickled salmon.		Fresh salmon.	
	Pounds.	Value.	Pounds.	Value.
1905.				
United States	1,415	$71		
Japan	16,526	1,221		
1907.				
United States	13,604	1,086		
Japan	19,862	1,601		
1908.				
United States	7,406	623	900	$92
Japan	6,130	465		
1909.				
United States	10,779	740		
Japan	4,295	344		
1910.				
United States				
Japan				

TUTUILA, SAMOA.

The customs statistics lump the imports of fish under one general heading, thus making it impossible to show separately the imports of salmon.

X. FOREIGN TRADE IN SALMON.

As we do not consume all of the salmon produced by our fisheries, it is necessary to find a foreign market for the surplus each season, but as canned salmon has become one of the staples of the world, there is not much difficulty in this respect, especially since our only competitors are Canada and Japan. The latter has not yet become much of a factor in the canned-salmon market, though she will as her fishing operations are extended. There is more competition in the pickled, fresh, and frozen markets, several European and Asiatic countries being large producers of these goods, as is Canada also, for a considerable proportion of which she is compelled to find an outside market.

EXPORTS OF CANNED SALMON.

From the beginning of the industry a considerable proportion of the salmon canned has been exported, especially of the higher grades. In Europe the chief customer is Great Britain, taking about nine-tenths of all sent to European ports. Great Britain does not, however, consume this quantity, for a considerable part of her importations are reexported. On the North American Continent and adjacent islands the best customers are Mexico, Panama, and the British West Indies, in the order named. In South America, Peru, Argentina, and British Guiana were the leading markets in 1910. In 1908 Chile imported 4,196,060 pounds; in 1909 the importations dropped to 97,993 pounds, but increased in 1910 to 1,556,629 pounds. In Asia, Hongkong and China import canned salmon, although neither buys great quantities. The islands of the Pacific and Indian Oceans are large consumers. British Australasia took 5,474,818 pounds, valued at $551,312, in 1910, and other good customers were the British East Indies and British, French, and German Oceania. In Africa the British and Portuguese possessions are the largest importers.

The movements of these products are naturally often influenced favorably or adversely as the tariffs of the various countries in which they are marketed are raised or lowered.

The following table shows the yearly exports of domestic canned salmon and the countries to which exported for the period from 1900 to 1910, inclusive:

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910.

Countries.	1900		1901		1902	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
North America:						
Dominion of Canada—						
Nova Scotia, New Brunswick, etc.					10	$1
Quebec, Ontario, Manitoba, etc	24,137	$2,514	101	$10	22,442	2,493
British Columbia	382,811	33,454	1,725,251	223,230	1,866,272	159,682
Newfoundland and Labrador					810	73
Miquelon, Langley, etc	240	20				
Mexico	162,785	14,806	160,425	14,967	387,905	31,041
Central American States—						
British Honduras	16,488	1,604	19,331	2,054	23,467	2,370
Costa Rica	70,458	6,114	69,135	6,768	70,036	5,954
Guatemala	2,666	277	11,361	1,151	15,325	1,324
Honduras	7,193	677	7,681	776	4,924	498
Nicaragua	26,647	2,684	21,543	2,256	17,125	1,635
Salvador	550	60	550	55	1,828	161
Bermuda	59,672	6,158	63,786	7,398	76,456	7,768
West Indies—						
British	259,249	25,651	315,209	33,635	242,999	24,191
Danish	9,085	873	8,612	929	14,526	1,390
Dutch	13,303	1,610	16,591	1,944	13,112	1,506
French	432	45	1,084	127	960	96
Haiti	468	44	595	65	920	88
Santo Domingo	2,764	297	1,899	192	1,531	140
Cuba	8,406	786	20,407	1,883	20,196	1,618
Porto Rico	4,394	390				
South America:						
Argentina	104,367	8,822	127,751	10,916	88,622	7,816
Bolivia			240	37	15,110	1,147
Brazil	637,638	76,152	207,033	23,506	87,800	8,350
Chile	647,328	61,800	645,323	64,059	384,766	28,529
Colombia	92,868	9,075	97,163	9,975	86,046	7,451
Ecuador	50,387	5,631	98,587	10,387	24,937	1,868
Guiana—						
British	168,718	16,197	136,192	14,807	146,502	14,604
Dutch	43,096	3,553	61,334	6,542	92,971	8,718
French	3,240	299	2,248	261	8,316	850
Peru	75,621	7,392	124,823	12,526	313,476	24,444
Uruguay	2,837	285	9,408	933	1,016	104
Venezuela	42,125	3,712	66,911	6,913	42,436	4,026
Europe:						
Austria-Hungary	2,208	309			250	25
Azores, and Madeira Islands	48	7	950	92		
Belgium	31,118	3,186	5,800	600	336	39
Denmark	24,492	2,455	3,168	326	860	92
France	22,544	2,130	61,790	6,565	23,956	1,889
Germany	16,110	1,431	77,921	7,567	10,905	1,068
Italy	120	10	2,496	244		
Malta, Gozo, etc			141	21		
Netherlands	3,048	299	288	30	4,800	400
Portugal	19,776	1,779			336	35
Russia, on Baltic and White Seas					8,400	932
Spain			1,536	151	675	67
Sweden and Norway	1,168	112	720	70	72	8
Switzerland	24	3				
United Kingdom	18,820,453	1,870,004	31,722,853	3,219,196	30,632,961	2,620,729
Asia and Oceania:						
Aden	216	22				
Chinese Empire	40,960	4,255	149,295	15,263	117,043	8,716
China—Russian			20,634	2,058	9,460	772
Hongkong	63,210	6,488	78,960	8,056	551,860	40,261
Japan	11,560	1,200	285,036	28,990	14,578	1,220
Korea			1,105	115	2,208	179
Russia, Asiatic			1,495	145	6,572	521
Turkey in Asia			144	16		
East Indies—						
British	538,180	55,976	312,805	31,528	733,685	56,912
Dutch			3,960	400	161,940	12,093

Exports, by Countries, of Domestic Canned Salmon, 1900 to 1910—Continued.

Countries.	1900		1901		1902	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Asia and Oceania—Continued.						
British Australasia	2,804,004	$283,110	3,442,085	$343,540	7,131,641	$599,671
British Oceania					151,998	10,555
French Oceania	103,940	10,732	118,355	12,026	142,570	11,355
German Oceania			8,480	874	12,900	997
Guam [a]	480	50				
Hawaii [b]	860,682	84,808				
Philippine Islands	1,160	120	39,316	3,925	718,876	46,712
Tonga, Samoa, and all other	112,380	11,646	73,040	7,168		
Tutuila [c]					21,176	1,451
Africa:						
British Africa	632,012	57,387	816,433	79,063	2,581,088	219,233
Canary Islands			656	66		
French Africa	4,320	421	4,080	415	200	21
Liberia	312	30				
Portuguese Africa	47,812	4,696	35,384	3,459	52,726	4,931
All other Africa					6,200	582
Total	27,082,370	2,693,648	41,289,500	4,230,271	47,173,114	3,991,402
RECAPITULATION.						
Europe	18,941,109	1,881,725	31,877,663	3,234,862	30,683,551	2,625,284
North America	1,051,808	98,064	2,443,561	297,440	2,780,844	242,029
South America	1,868,225	192,918	1,577,013	160,862	1,291,998	107,907
Asia	654,126	67,941	853,434	86,571	1,597,346	120,674
Oceania	3,882,646	390,466	3,681,276	367,533	8,179,161	670,741
Africa	684,456	62,534	856,553	83,003	2,640,214	224,767

Countries.	1903		1904		1905	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
North America:						
Dominion of Canada					290,850	$21,121
Nova Scotia, New Brunswick, etc			49	$4		
Quebec, Ontario, Manitoba, etc	43.107	$5,171	153,697	9,558		
British Columbia	3,246,082	287,212	1,086,370	95,021		
Newfoundland and Labrador					240	25
Mexico	356,951	26,787	538,949	38,691	493,371	40,597
Central American States—						
British Honduras	24,187	2,316	28,044	2,534	28,959	2,534
Costa Rica	36,806	3,072	58,828	4,668	93,580	8,179
Guatemala	3,527	295	15,732	1,131	20,498	1,583
Honduras	7,455	716	12,428	1,090	14,434	1,221
Nicaragua	20,089	1,771	28,159	2,394	42,103	3,146
Panama [d]			18,466	1,671	112,320	9,211
Salvador	3,360	252	4,304	326	2,296	184
Bermuda	64,264	6,792	36,022	3,778	33,821	3,634
West Indies—						
British	418,636	38,434	409,219	37,389	366,747	34,262
Danish	9,647	903	7,442	752	9,474	965
Dutch	22,981	2,480	17,878	1,999	13,051	1,419
French	892	92	984	86	660	64
Haiti	2,496	238	2,115	228	1,611	164
Santo Domingo	3,290	335	7,660	719	4,855	452
Cuba	21,636	1,789	24,677	2,324	36,903	3,373
South America:						
Argentina	72,445	6,808	66,275	6,612	120,586	11,263
Bolivia	384	40	672	80	170	17
Brazil	88,740	8,481	114,033	11,742	1881342	17,908
Chile	1,044,490	59,354	1,218,266	72,205	821,171	56,160
Colombia	149,272	11,194	118,269	10,104	81,239	7,491
Ecuador	45,126	3,115	59,266	4,041	121,894	7,941
Guiana—						
British	172,300	16,829	112,360	11,226	135,424	13,617
Dutch	52,138	4,959	78,464	8,280	45,231	4,797
French	18,752	1,805	11,169	1,307	11,684	1,228
Peru	89,440	7,309	214,982	15,530	151,832	11,369
Uruguay	2,140	185	2,246	225	3,250	325
Venezuela	20,987	1,839	59,857	5,981	28,005	2,825

[a] Guam was annexed to the United States in 1898.
[b] Hawaii was annexed to the United States in 1898.
[c] Tutuila was acquired in 1898.
[d] Panama separated from Colombia in 1903.

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910—Continued.

Countries.	1903		1904		1905	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Europe:						
Austria-Hungary	400	$25	384	$36		
Azores, and Madeira Islands			48	5	384	$41
Belgium	788	73	480	53	9,760	1,019
Denmark	80	8	100	8		
France	2,400	260	4,800	600	21,995	2,262
Germany	32,268	2,470	18,790	1,747	1,210	122
Italy	1,120	114	5,232	556	5,760	465
Netherlands	1,072	124	4,072	414	3,250	349
Norway [a]	96	10	1,440	150		
Spain	3,108	316	1,400	140	2,700	249
Sweden [a]			70	7	96	10
Switzerland	240	24				
United Kingdom	35,369,196	3,121,774	33,555,080	3,505,102	21,026,108	1,872,992
Asia and Oceania:						
Aden					2,520	180
Chinese Empire	166,522	13,602	218,142	18,770	249,386	17,587
China—Russian	53,368	5,111	40,000	3,932		
Hongkong	814,008	56,225	160,367	11,870	518,423	36,635
Japan	13,536	1,015	11,817,343	841,461	2,437,484	162,524
Korea	2,152	179	3,888	292	2,572	186
Russia, Asiatic	48	4	482	41		
Siam					384	31
East Indies—						
British	473,740	39,367	636,320	44,669	673,897	55,599
French					720	69
Dutch	235,680	19,256	119,216	9,018	109,476	7,893
All other Asia	240	24	10	1		
British Australasia	4,268,652	360,720	3,136,728	290,307	4,075,094	389,518
British Oceania	36,018	2,290	28,670	1,941	42,624	3,645
French Oceania	153,696	12,179	185,848	15,305	133,204	11,414
German Oceania	451,824	26,614	340,464	19,326	324,888	20,651
Philippine Islands	601,324	42,702	206,896	14,970	681,636	42,700
Africa:						
British Africa	1,454,226	127,921	794,758	77,911	1,259,269	121,120
Canary Islands	144	15			900	90
French Africa	2,220	207	3,200	320	4,800	460
Liberia	384	41	140	14	140	14
Portuguese Africa	167,964	17,043	137,640	13,906	200,826	20,365
Turkey in Africa—Egypt			388	30	2,448	204
All other Africa	5,200	506				
Total	50,353,334	4,350,791	55,924,278	5,224,598	35,066,555	3,035,469
RECAPITULATION.						
Europe	35,410,768	3,125,197	33,591,896	3,508,818	21,071,263	1,877,509
North America	4,285,406	378,655	2,446,023	204,363	1,565,773	132,134
South America	1,756,214	121,918	2,055,859	147,333	1,708,828	134,941
Asia	1,759,294	134,783	12,995,768	930,054	3,994,862	280,704
Oceania	5,511,514	444,505	3,898,606	341,849	5,257,446	467,928
Africa	1,630,138	145,733	936,126	92,181	1,468,383	142,253

Countries.	1906		1907		1908	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
North America:						
Dominion of Canada	236,664	$14,814	793,247	$65,356	7,320	$587
Mexico	699,002	56,747	877,989	73,582	1,068,824	94,278
Central American States—						
British Honduras	43,155	3,639	36,020	3,214	32,632	3,080
Costa Rica	106,879	8,968	148,157	12,260	138,421	12,260
Guatemala	26,925	1,989	31,242	2,535	29,777	2,319
Honduras	15,148	1,319	23,508	2,048	33,955	3,202
Nicaragua	39,949	3,022	41,106	3,335	27,721	2,302
Panama [b]	308,624	25,965	443,687	38,642	487,079	46,883
Salvador	2,880	197	4,092	331	5,854	467
Bermuda	24,679	2,406	29,139	2,711	25,183	2,579
West Indies—						
British	471,814	43,368	515,664	46,510	687,620	64,275
Danish	9,713	1,011	13,336	1,340	15,604	1,658
Dutch	11,643	1,230	24,275	2,428	21,368	2,234
French	200	20	100	9	96	11
Haiti	2,953	291	914	91	864	85
Santo Domingo	11,688	1,137	9,278	891	13,887	1,371
Cuba	57,441	5,823	60,904	5,855	57,970	5,288

[a] Sweden and Norway separated in 1905. [b] Panama separated from Colombia in 1903.

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910—Continued.

Countries.	1906		1907		1908	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
South America:						
Argentina	200,206	$20,339	262,667	$25,801	394,306	$30,759
Bolivia	1,720	181	18,951	1,577	11,762	1,217
Brazil	188,278	18,975	150,592	14,880	146,826	14,055
Chile	4,462,147	154,396	4,168,876	286,229	4,196,060	295,194
Colombia	51,987	4,667	41,964	3,850	51,786	4,880
Ecuador	80,876	5,855	203,930	15,599	174,920	12,486
Guiana—						
British	120,016	12,391	116,120	12,202	140,514	16,014
Dutch	65,654	6,246	66,530	6,494	59,390	6,053
French	12,650	1,305	17,950	1,829	23,218	2,599
Peru	269,858	20,342	551,160	40,431	316,701	22,229
Uruguay	10,436	1,075	16,124	1,546	17,934	1,693
Venezuela	35,775	3,280	44,826	4,336	37,583	3,564
Europe:						
Austria-Hungary	1,260	135	1,220	112		
Azores, and Madeira Islands			883	89		
Belgium	500	60				
Denmark	40,200	4,112				
France	29,980	3,000			10,575	961
Germany	4,896	420	9,150	976	45,977	4,572
Italy	4,920	413	10,230	861		
Malta, Gozo, etc	420	36				
Netherlands	8,280	959	11,098	850		
Norway[a]	40,200	3,981			17,670	1,860
Portugal					7,577	731
Spain	1,930	193	3,208	303	27,900	2,735
Sweden[a]	10,000	1,050			10,500	1,000
United Kingdom	31,918,816	2,739,284	7,720,991	788,245	13,200,887	1,193,516
Asia and Oceania:						
Aden	480	50				
Chinese Empire	32,189	2,321	59,110	4,386	23,126	2,154
Hongkong	105,581	7,652	122,482	9,959	144,624	13,367
Japan	9,051	713	22,881	1,775	2,472	269
Korea	1,632	128	1,500	129	1,156	126
Russia, Asiatic	1,440	102	770	84	582	65
Siam			1,440	90	3,264	282
Turkey in Asia	750	90			290	30
East Indies—						
British	477,234	38,263	1,043,618	75,001	702,169	59,254
French	16,262	1,162			720	75
Dutch	134,796	9,692	167,590	13,940	126,168	11,286
British Australasia	5,230,076	426,814	5,451,378	462,648	3,654,756	330,029
British Oceania	11,952	923	40,080	2,958	14,660	1,278
French Oceania	125,998	10,274	137,472	11,494	185,608	15,732
German Oceania	214,920	14,503	156,939	11,267	105,696	8,345
Philippine Islands	757,400	56,743	933,288	63,838	1,171,834	84,533
Africa:						
British Africa	1,029,787	87,881	504,848	47,748	454,892	43,883
Canary Islands	782	76	144	17		
French Africa	144	14			48	6
German Africa			600	60		
Liberia					5,079	482
Portuguese Africa	161,178	16,001	104,837	10,307	83,640	8,325
Turkey in Africa—Egypt	2,400	200				
Total	45,944,414	3,847,943	25.218,105	2,183,049	28,226,045	2,438,518
RECAPITULATION.						
Europe	32,061,402	2,753,643	7,756,780	791,436	13,321,086	1,205,375
North America	2,069,357	171,946	3,052,658	261,138	2,654,175	242,879
South America	3,4991603	249,052	5,659,690	414,774	5,571,000	410,743
Asia	779,415	60,173	1,419,391	105,364	1,004,571	86,908
Oceania	6,340,346	509,257	6,719,157	552,205	5,131,554	439,917
Africa	1,194,291	103,872	610,429	58,132	543,659	52,696

[a] Sweden and Norway separated in 1905.

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910—Continued.

Countries.	1909		1910	
	Pounds.	Value.	Pounds.	Value.
North America:				
Dominion of Canada	229,934	$21,773	99,022	$7,570
Mexico	756,052	58,124	697,217	50,782
Central American States—				
British Honduras	35,195	3,261	28,310	2,606
Costa Rica	118,266	9,828	157,946	12,237
Guatemala	13,957	1,117	16,821	1,361
Honduras	14,112	1,179	16,240	1,361
Nicaragua	21,534	1,656	28,116	2,066
Panama [a]	528,228	50,940	482,717	45,404
Salvador	9,184	754	5,498	423
Bermuda	23,774	2,461	26,484	2,383
West Indies—				
British	358,114	36,644	548,561	53,939
Danish	14,848	1,568	14,655	1,512
Dutch	16,621	1,883	9,838	1,160
French	564	69	196	18
Haiti	2,184	203	2,038	185
Santo Domingo	13,258	1,306	22,120	2,058
Cuba	53,580	5,277	68,737	6,486
South America:				
Argentina	259,192	17,030	229,461	15,690
Bolivia	6,184	647	33,502	2,941
Brazil	176,150	17,109	267,354	28,241
Chile	97,993	6,918	1,556,629	92,259
Colombia	58,518	5,767	114,274	9,494
Ecuador	139,868	10,952	272,411	16,487
Guiana—				
British	255,039	25,981	222,398	22,133
Dutch	100,259	9,906	57,509	6,297
French	22,816	2,164	17,724	1,784
Peru	295,885	22,640	367,676	24,817
Uruguay	15,140	1,330	11,730	1,167
Venezuela	34,618	3,058	43,144	4,887
Europe:				
Azores, and Madeira Islands	....	....	100	12
Denmark	192	18	....	....
France	....	....	1,878	223
Germany	17,096	1,757	424	51
Italy	5,148	500	....	....
Netherlands	11,612	1,017	9,744	1,020
Russia on Baltic and White Seas	2,050	205	11,580	1,210
Spain	3,160	311	5,100	506
Sweden [b]	20,000	1,940	....	....
United Kingdom	22,969,218	2,201,446	44,737,072	4,709,160
Asia and Oceania:				
Chinese Empire	53,448	4,887	28,522	2,688
China—British leased territory	....	....	3,120	345
Hongkong	103,448	9,707	121,558	12,234
Japan	15,078	1,245	3,716	352
Korea	2,652	266	2,016	220
Russia, Asiatic	5,380	394	....	....
Siam	14,880	1,025	1,008	93
East Indies—				
British	989,592	85,094	1,246,751	101,619
French	528	56	....	....
Dutch	201,696	16,908	189,604	15,920
All other Asia	....	....	480	45
British Australasia	5,704,960	590,094	5,474,818	551,312
British Oceania	109,936	7,437	66,826	5,160
French Oceania	162,336	14,570	241,200	22,589
German Oceania	279,792	18,311	360,576	22,554
Philippine Islands	1,126,470	74,792	5,425,404	396,604
Africa:				
British Africa	484,196	48,220	357,051	37,707
Canary Islands	510	51	....	....
German Africa	350	36	910	92
Portuguese Africa	162,314	14,604	151,470	14,674
Turkey in Africa—Egypt	....	....	1,440	120
Total	36,117,109	3,416,436	63,860,696	6,314,258
RECAPITULATION.				
Europe	23,028,476	2,207,194	44,765,898	4,712,182
North America	2,209,405	198,043	2,224,516	191,551
South America	1,461,662	123,502	3,193,812	226,197
Asia	1,386,702	119,582	1,596,775	133,516
Oceania	7,383,494	705,204	11,568,824	998,219
Africa	647,370	62,911	510,871	52,593

[a] Panama separated from Colombia in 1903. [b] Sweden and Norway separated in 1898.

The table following shows for the past 11 years the customs districts from which the canned salmon was exported. Up to 1910 about two-thirds of the total exports have gone from the port of San Francisco, while about one-fifth of the total passed through the port of Puget Sound, Wash. In 1910, however, the exports from Puget Sound exceeded those from San Francisco. The only other port through which any considerable quantity is shipped is New York City. It is usual now to load the salmon on steamers and sailing vessels at San Francisco and the Puget Sound cities to go direct to Europe.

EXPORTS, BY CUSTOMS DISTRICTS, OF CANNED SALMON, 1900 TO 1910.

Customs districts from which exported.	1900		1901		1902	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Atlantic ports:						
Baltimore, Md	648	$65	334,580	$33,053	324	$34
Bangor, Me					10	1
Boston and Charlestown, Mass	222,770	20,488	192,676	27,372	172,110	20,224
New York, N. Y	3,485,326	340,538	7,960,104	847,294	4,365,074	407,009
Philadelphia, Pa	110,500	9,100	77,000	9,050		
Savannah, Ga	1,012	81	582	72	480	60
St. Johns, Fla					75	7
Norfolk and Portsmouth, Va			269,380	30,888		
Charleston, S. C	400	30				
Gulf ports:						
Key West, Fla			400	43		
Mobile, Ala	10,536	958	7,340	816	11,032	1,055
New Orleans, La	28,332	2,472	47,685	4,567	39,084	3,910
Mexican border ports:						
Arizona	6,253	706	18,104	1,869	23,879	2,350
Brazos de Santiago, Tex	168	21	816	115	300	29
Paso del Norte, Tex	23,843	2,134	1,220	98	164,167	13,119
Pacific ports:						
Alaska	289	38	4,859	291	3,636	558
Hawaii					48	4
Puget Sound, Wash	1,477,232	144,059	2,271,306	282,441	9,864,259	872,912
San Diego, Cal	3,094	220	3,574	293	6,202	487
San Francisco, Cal	21,611,030	2,164,904	30,014,055	2,983,982	32,327,572	2,654,020
Willamette, Oreg	76,800	5,320	43,318	3,517	155,500	11,250
Northern border and Lake ports:						
Detroit, Mich			26,200	2,700		
Minnesota, Minn			101	10		
Vermont, Vt	120	12				
Duluth, Minn	24,000	2,500	16,200	1,800	39,312	4,368
Memphremagog, Vt	17	2			50	5
Total	27,082,370	2,693,648	41,289,500	4,230,271	47,173,114	3,991,402
RECAPITULATION.						
Atlantic ports	3,820,656	370,302	8,834,322	947,729	4,538,073	427,335
Gulf ports	38,868	3,430	55,425	5,426	50,116	4,965
Mexican border ports	30,264	2,861	20,140	2,082	188,346	15,498
Pacific ports	23,168,445	2,314,541	32,337,112	3,270,524	42,357,217	3,539,231
Northern border and Lake ports	24,137	2,514	42,501	4,510	39,362	4,373

EXPORTS, BY CUSTOMS DISTRICTS, OF CANNED SALMON, 1900 TO 1910—Continued.

Customs districts from which exported.	1903		1904		1905	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Atlantic ports:						
Baltimore, Md	840	$92	490	$50	576	$62
Bangor, Me			121	9	294	26
Boston and Charlestown, Mass	104,750	12,266	2,400	215		
New York, N. Y	5,627,654	599,393	2,129,523	214,016	2,683,775	266,599
Philadelphia, Pa	540	54	587	42	8,858	576
Providence, R. I	685	63				
Gulf ports:						
Key West, Fla			1,500	125	460	23
Mobile, Ala	9,612	824	9,203	811	7,102	561
New Orleans, La	44,404	4,261	61,909	5,503	89,999	7,841
Tampa, Fla			180	16		
Mexican border ports:						
Arizona	26,988	2,803	7,568	745	20,845	1,878
Brazos de Santiago, Tex			96	7		
Paso del Norte, Tex	103,375	8,938	347,218	23,401	262,014	20,687
Saluria, Tex			366	30	6,580	583
Pacific ports:						
Alaska			153,600	9,550	4,848	557
Hawaii			48	7	148	15
Puget Sound, Wash	16,527,456	1,549,319	19,766,003	1,655,666	4,444,562	326,485
San Diego, Cal	5,897	421	5,678	422	3,594	259
San Francisco, Cal	27,448,182	2,138,019	33,212,614	3,303,292	27,498,325	2,406,422
Willamette, Oreg	409,444	29,142	224,549	10,628	5,775	531
Oregon, Oreg	400	25				
Northern border and Lake ports:						
Detroit, Mich			580	58		
North and South Dakota			20	2		
Superior, Mich					28,800	2,364
Vermont, Vt	74	7	25	3		
Duluth, Minn	43,033	5,164				
Total	50,353,334	4,350,791	55,924,278	5,224,598	35,066,555	3,035,469
RECAPITULATION.						
Atlantic ports	5,734,469	611,868	2,133,121	214,332	2,693,503	267,263
Gulf ports	54,016	5,085	72,792	6,455	97,561	8,425
Mexican border ports	130,363	11,741	355,248	24,183	289,439	23,148
Pacific ports	44,391,379	3,716,926	53,362,492	4,979,565	31,957,252	2,734,269
Northern border and Lake ports	43,107	5,171	625	63	28,800	2,364

Customs districts from which exported.	1906		1907		1908	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Atlantic ports:						
Baltimore, Md	196	$21	156	$28	301	$37
New York, N. Y	3,275,875	318,128	2,313,335	227,646	2,332,392	226,850
Philadelphia, Pa	1,400	159	722	67	720	71
Portland and Falmouth, Me	100	13				
St. Johns, Fla			322	38	1,250	155
Gulf ports:						
Galveston, Tex	60	8	40,213	3,216	292	23
Key West, Fla	890	94	312	25	190	18
Mobile, Ala	38,267	3,031	11,675	992	10,823	1,051
New Orleans, La	88,014	7,775	112,850	10,217	194,711	18,144
Sabine, Tex					104	9
Tampa, Fla	24	2				
Mexican border ports:						
Arizona	45,883	4,128	34,479	3,268	43,035	3,856
Corpus Christi, Tex					30,930	2,775
Paso del Norte, Tex	387,568	30,336	513,202	42,548	626,837	56,147
Saluria, Tex	21,962	1,666	22,662	1,960	22,887	2,341
Pacific ports:						
Alaska			305,294	33,315	790	99
Hawaii					144	14
Los Angeles, Cal	840	53				
Puget Sound, Wash	17,286,930	1,499,819	9,340,000	845,982	6,351,440	528,558
San Diego, Cal	4,228	331	8,456	661	6,994	567
San Francisco, Cal	24,613,868	1,969,214	12,502,876	1,012,199	18,601,705	1,597,735
Willamette, Oreg	540	55	3,723	241	100	22

EXPORTS, BY CUSTOMS DISTRICTS, OF CANNED SALMON, 1900 TO 1910—Continued.

Customs districts from which exported.	1906		1907		1908	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Northern border and Lake ports:						
Huron, Mich	177,734	$13,107	7,000	$570		
Minnesota, Minn			48	5		
Oswegatchie, N. Y			780	71	400	$46
Vermont, Vt	35	3				
Total	45,944,414	3,847,943	25,218,105	2,183,049	28,226,045	2,438,518
RECAPITULATION.						
Atlantic ports	3,277,571	318,321	2,314,535	227,779	2,334,663	227,113
Gulf ports	127,255	10,910	165,050	14,450	206,120	19,245
Mexican border ports	455,413	36,130	570,343	47,776	723,689	65,119
Pacific ports	41,906,406	3,469,472	22,160,349	1,892,398	24,961,173	2,126,995
Northern border and Lake ports	177,769	13,110	7,828	646	400	46

Customs districts from which exported.	1909		1910	
	Pounds.	Value.	Pounds.	Value.
Atlantic ports:				
Baltimore, Md	192	$22	36	$3
Bangor, Me	216	25		
Boston and Charlestown, Mass	162,024	16,837	3,000	280
New York, N. Y	3,848,870	390,266	2,999,480	305,732
Philadelphia, Pa	405	44	700	89
Norfolk and Portsmouth, Va	32,100	2,739		
Perth Amboy, N. J			214	18
Gulf ports:				
Galveston, Tex	876	88	155	12
Key West, Fla	40	4	340	27
Mobile, Ala	13,565	1,247	14,018	1,322
New Orleans, La	92,537	7,615	103,980	8,187
Tampa, Fla			66	6
Mexican border ports:				
Arizona	27,735	2,733	54,425	4,612
Brazos de Santiago, Tex	138	13	641	64
Corpus Christi, Tex	26,220	2,450	27,365	2,414
Paso del Norte, Tex	150,636	14,850	125,169	11,560
Saluria, Tex	14,399	1,528	47,117	2,853
Pacific ports:				
Alaska	66,020	6,263		
Los Angeles, Cal	13,370	934	9,229	820
Puget Sound, Wash	7,858,552	716,370	32,406,617	3,331,174
San Diego, Cal	5,546	460	6,355	583
San Francisco, Cal	23,761,656	2,247,957	28,027,911	2,641,608
Willamette, Oreg			78	11
Northern border and Lake ports:				
Detroit, Mich	42,000	3,990		
North and South Dakota	12	1		
Duluth, Minn			33,200	2,800
Montana and Idaho			600	83
Total	36,117,109	3,416,436	63,860,696	6,314,258
RECAPITULATION.				
Atlantic ports	4,043,807	409,933	3,003,430	306,122
Gulf ports	107,018	8,954	118,559	9,554
Mexican border ports	219,128	21,574	254,717	21,503
Pacific ports	31,705,144	2,971,984	60,450,190	5,974,196
Northern border and Lake ports	42,012	3,991	33,800	2,883

EXPORTS OF FRESH AND CURED SALMON.

The following table shows, by countries, the value of the exports of fresh and cured salmon for the period 1900 to 1910, inclusive. As with the canned salmon, the greater part of these exports go to European countries, Germany taking by far the largest quantity. A small portion of this is salmon caught in eastern waters.

EXPORTS, BY COUNTRIES RECEIVING, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910.

Exported to—	1900	1901	1902	1903	1904	1905
North America:						
Bermuda	$88	$14	$11	$21		$246
British Honduras	7	9		22	$120	94
Dominion of Canada—						
Nova Scotia, New Brunswick, etc					418	3
Quebec, Ontario, Manitoba, etc	1,516	2,555	1,051	6,083	3,572	7,499
British Columbia	80,652	53,922	125,916	53,592	25,913	10,299
Central American States—						
Costa Rica	220	703	218	178	340	192
Guatemala			27	11	1	208
Honduras		5		1	2	26
Nicaragua	53	26	40	78	40	75
Panama					167	315
Salvador		22		7		
Mexico	1,330	664	1,925	1,397	1,266	1,136
West Indies—						
British	943	939	2,348	5,150	3,867	4,999
Cuba	429	376	273	114	194	162
Danish	12	31	38	84	13	67
Dutch	195	167	293	177	197	238
French	126	122	315	199	273	100
Haiti	181	191	164	54	11	124
Porto Rico	1,214					
Santo Domingo	998	670	85	57	14	26
South America:						
Argentina					143	1,641
Bolivia			1,200			
Brazil	172	38	419	385	227	1,160
Chile	142			70	164	
Colombia	416	223	657	441	17	
Ecuador			65			15
Guiana—						
British	30	82	30	262	60	161
Dutch	400	226	286	11	766	176
French	420	290	134	434	251	65
Peru	26		27	62	194	112
Venezuela	96	42	245	25		108
Europe:						
Azores, and Madeira Islands	3				123	85
Belgium		1,062	88		4,750	
Denmark	378	15,285	16,904	653	2,315	22,952
France	180	300			57	
Germany	300,291	320,369	470,657	741,634	1,061,944	1,666,787
Greece						158
Italy						100
Malta, Gozo, etc	475	55	280	28		
Netherlands	50	184	3,023	4,127	3,105	300
Norway				12,765	12,295	7,896
Russia in Europe	300					2,574
Spain						56
Sweden and Norway[a]	7	5,595	5,685			
Sweden					1,838	17,776
United Kingdom	38,959	1,528		990	8,523	29,355
Asia:						
Chinese Empire		400	25	9	54	201
China—Russian				15		
East Indies—						
British		121	71	30	115	135
Dutch					275	
Hongkong	507		519	1,840	462	4,797
Japan	2,807	14,516	25,228	3,499	476	25,037
Russia—Asiatic	10					
Oceania:						
British Australasia	39,867	618	33,785	31,503	25,208	21,595
All other British Oceania			346	29	27	22
French Oceania	1,958	1,729	1,325	1,877	1,838	2,299
German Oceania			13	948	977	861
Guam	57	3,420				
Hawaii	58,870					

[a] Sweden and Norwa y separated in 1898.

EXPORTS, BY COUNTRIES RECEIVING, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910—Continued.

Exported to—	1900	1901	1902	1903	1904	1905
Oceania—Continued.						
Philippine Islands			$384	$478	$13	$308
Tonga, Samoa, and all other	$636	$215				
Tutuila			10			
Africa:						
British Africa—						
West			304			
South	170	24	21	12	859	114
French Africa	85					
Liberia					5	
Total	535,276	426,738	694,435	869,352	1,163,489	1,832,655
RECAPITULATION.						
North America	87,964	60,416	132,704	67,225	36,408	25,809
South America	1,702	901	3,063	1,690	1,822	3,438
Europe	340,643	344,368	496,637	760,197	1,094,950	1,748,039
Asia	3,324	15,037	25,843	5,393	1,382	30,170
Oceania	101,388	5,982	35,863	34,835	28,063	25,085
Africa	255	24	325	12	864	114

Exported to—	1906	1907	1908	1909	1910
North America:					
Bermuda	$173	$20	$23	$68	$630
British Honduras	14		1,036		
Dominion of Canada—Nova Scotia, New Brunswick, etc	32,925	18,785	16,964	21,973	23,559
Central American States—					
Costa Rica	46	213	189	217	197
Guatemala	40		902	18	62
Honduras		92	2,451		
Nicaragua	39	27	1,317	31	11
Panama	380	2,211	1,878	175	775
Mexico	1,231	528	460	199	555
West Indies—					
British	1,646	208	975	4,890	3,067
Cuba	128	371	104	121	97
Danish	30	108	39	165	42
Dutch	94	93		49	78
French		16	19	14	19
Haiti	97	277	678	335	283
Santo Domingo	100	255	228	128	313
South America:					
Argentina	85	500			
Brazil	308			120	3,029
Chile	15	20	56		
Colombia	105	67	90	22	167
Ecuador		391		290	
Guiana—					
British	218	5	48	76	823
Dutch	287	133	130	271	217
French	57	36	75	21	695
Peru	1,317	1,163	118	555	
Venezuela	208	36			311
Uruguay				10	
Europe:					
Azores, and Madeira Islands		95			
Belgium	114			410	
Denmark	36,623	108,269	90,015	81,195	83,580
France		150		250	415
Germany	1,670,366	1,601,166	1,422,846	1,038,530	1,223,595
Italy	137				
Netherlands	793	264	2,947		
Norway	9,303	11,390	22,104	22,917	45,885
Portugal		1,650			
Russia in Europe		140		14,735	5,260
Spain		55		289	
Sweden	32,554	23,469	21,540	23,670	42,725
United Kingdom	26,196	48,237	28,083	43,952	66,555
Asia:					
Chinese Empire	3,391	293	170	41	89
East Indies—					
British	63		66	18	60
Dutch					41
Hongkong	1,339	687	13	809	10
Japan	88,068	18,395	3,592	2,772	90
Korea		3			3
Russia—Asiatic		6	121		
Turkey in Asia					55

EXPORTS, BY COUNTRIES RECEIVING, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910—Continued.

Exported to—	1906	1907	1908	1909	1910
Oceania:					
British Australasia	$15,169	$23,186	$26,591	$25,466	$22,826
All other British Oceania	21		11		89
French Oceania	2,154	2,136	1,792	1,528	1,886
German Oceania	749	1,112	373	1,229	1,189
Philippine Islands	821	12,287		712	2,089
Africa:					
British Africa—South	20				1,268
Liberia	40				
Portuguese Africa			198		
Spanish Africa				289	
Total	1,927,464	1,878,743	1,648,044	1,288,560	1,532,640
RECAPITULATION.					
North America	36,943	23,204	27,263	28,383	29,688
South America	2,600	2,351	517	1,365	5,242
Europe	1,776,086	1,794,885	1,587,535	1,225,948	1,468,015
Asia	92,861	19,384	3,962	3,640	348
Oceania	18,914	38,721	28,767	28,935	28,079
Africa	60	198		289	1,268

The exports of domestic fresh and cured salmon from 1900 to 1910, inclusive, are shown below, by customs districts. The greater part of the shipments pass through the New York City customs district:

EXPORTS, BY CUSTOMS DISTRICTS, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910.

Customs districts from which exported.	1900	1901	1902	1903	1904	1905
Atlantic ports:						
Baltimore, Md			$158			$8
Bangor, Me						3
Belfast, Me	$12	$17	12	$19	$7	
Boston and Charlestown, Mass	16		34	52	418	
New York, N. Y	346,853	330,805	503,219	766,128	1,102,542	1,757,742
Philadelphia, Pa	10			1,151	7	
Portland and Falmouth, Me	11	68	16	47	60	79
Savannah, Ga	22					
Gulf ports:						
Mobile, Ala				30	8	96
New Orleans, La		5	143		116	63
Mexican border ports:						
Arizona	18	85	416	115		14
Brazos de Santiago, Tex				19	4	
Corpus Christi, Tex	414	13		30	208	
Paso del Norte, Tex	760	67	13		80	206
Saluria, Tex		370	1,428	1,063	868	777
Pacific ports:						
Alaska	2,377	12,422	293	4,375	1,003	1,184
Oregon, Oreg		17,500				
Puget Sound, Wash	80,493	55,727	150,906	58,278	29,212	36,145
San Diego, Cal	108	19	20	34	73	4
San Francisco, Cal	102,666	7,030	36,958	36,331	25,851	27,939
Willamette, Oreg					28	1,500
Northern border and Lake ports:						
Champlain, N. Y	234	1,464	449	1,542	1,183	2,142
Detroit, Mich		742	24		1,393	4,445
Genesee, N. Y					26	
Huron, Mich	456	121	225	55		
Memphremagog, Vt			6	7	24	
Montana and Idaho	2	6				6
North and South Dakota	523	162	95	36	378	247
Superior, Mich						33
Vermont, Vt	301	115	20	40		22
Total	535,276	426,738	694,435	869,352	1,163,489	1,832,655
RECAPITULATION.						
Atlantic ports	346,924	330,890	503,439	767,397	1,103,034	1,757,832
Gulf ports		5	143	30	124	159
Mexican border ports	1,192	535	1,857	1,227	1,160	997
Pacific ports	185,644	92,698	188,177	99,018	56,167	66,772
Northern border and Lake ports	1,516	2,610	819	1,680	3,004	6,895

EXPORTS, BY CUSTOMS DISTRICTS, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910—Continued.

Customs districts from which exported.	1906	1907	1908	1909	1910
Atlantic ports:					
Baltimore, Md	$11			$31	
Bangor, Me			$7	58	
Belfast, Me	15	$8		11	$12
New York, N. Y	1,781,330	1,786,105	1,590,757	1,230,436	1,479,625
Philadelphia, Pa	105				
Portland and Falmouth, Me	15	11,298	14	6	19
Gulf ports:					
Mobile, Ala	14		128		
New Orleans, La		276	7,098	49	74
Mexican border ports:					
Arizona	700	134	13	25	
Brazos de Santiago, Tex					5
Paso del Norte, Tex	8	290	154		
Saluria, Tex	80				197
Pacific ports:					
Alaska	44,436	451	803	1,091	212
Puget Sound, Wash	63,626	44,492	14,370	11,677	22,666
San Diego, Cal	44		28	4	12
San Francisco, Cal	31,500	28,984	29,112	37,305	27,628
Willamette, Oreg				743	3
Hawaii				14	
Northern border and Lake ports:					
Buffalo Creek, N. Y				3,069	
Cape Vincent, N. Y		92			
Champlain, N. Y	992	4,333	1,359	2,079	598
Detroit, Mich	3,954	1,972	1,667		
Duluth, Minn					68
Huron, Mich	428		284	891	
Memphremagog, Vt					20
Minnesota, Minn	40	52	798	59	
Montana and Idaho	69	92	45	154	82
North and South Dakota	36	3	20		
Vermont, Vt	61	161	1,387	858	1,419
Total	1,927,464	1,878,743	1,648,044	1,288,560	1,532,640
RECAPITULATION.					
Atlantic ports	1,781,476	1,797,411	1,590,778	1,230,542	1,479,656
Gulf ports	14	276	7,226	49	74
Mexican border ports	788	424	167	25	202
Pacific ports	139,606	73,927	44,313	50,834	50,521
Northern border and Lake ports	5,580	6,705	5,560	7,110	2,187

IMPORTS OF FRESH SALMON.

For some years it was the custom of the canneries on Puget Sound, when fish were scarce on the American side and abundant on the Canadian side, to import fresh salmon to fill out the domestic supply, and the Canadian canneries would do the same when the conditions were reversed. In 1904 the Canadian Government prohibited the export of fresh salmon to Puget Sound for packing purposes, and in 1910 an effort was made to have Congress retaliate by enacting a similar law for this side of the line, but the bill failed of passage. The reciprocity agreement with Canada now before Congress provides for the free entry of fresh fish and would permit the canneries of either country to import salmon as they wished. This agreement, if adopted, will undoubtedly be of considerable importance to the Puget Sound canneries in securing full packs in certain poor years.

The table below shows the yearly imports of fresh salmon from British Columbia:

IMPORTS OF FRESH SALMON FROM BRITISH COLUMBIA, CANADA, FOR A SERIES OF YEARS.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1890	4,660	$241	1897	93,454	$2,681	1904	40,610	$1,025
1891	4,950	170	1898	11,580	278	1905	1,015	35
1892	6,288	301	1899	58,002	4,101	1906	3,457,738	64,408
1893	64,811	3,639	1900	19,404	855	1907	113,224	4,131
1894	3,872	219	1901	27,072	2,050	1908	8,880	795
1895	14,000	1,403	1902	22,353	739	1909	41,073	2,346
1896	11,799	419	1903	6,860	343	1910	198,251	10,116

IMPORTS OF CURED SALMON.

Below are shown the imports into this country of foreign-cured salmon, the product of the Pacific salmon fisheries, from 1886 to 1909, inclusive.

IMPORTS OF FOREIGN PICKLED PACIFIC SALMON, 1886 TO 1909.

Year.	British Columbia.		Japan.		Hongkong.		Russia, Asiatic.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1886	5,600	$224							5,600	$224
1887	200	4							200	4
1888	86,000	4,031							86,000	4,031
1889	18,200	860							18,200	860
1890	600	36							600	36
1891	200	5							200	5
1892										
1893	5,478	291							5,478	291
1894	149,410	17,592			1,200	$29	11,875	$298	162,485	17,919
1895	6,550	250			600	13			7,150	263
1896	6,530	474							6,530	474
1897	6,890	156							6,890	156
1898	4,145	188			30	2	9,870	266	14,045	456
1899	15,875	1,554							a 16,032	a 1,560
1900	162,558	11,061	600	$41					163,158	11,102
1901	165,243	11,225							165,243	11,225
1902	175,411	13,794	606	28					176,017	13,822
1903	161,549	11,756	360	18					161,909	11,774
1904	282,210	23,319	1,400	52					283,610	23,371
1905	282,027	25,584	3,015	133					285,042	25,717
1906	35,475	1,730	5,510	175					40,985	1,905
1907	6,393	322	680	31					7,073	353
1908	13,230	631	4,185	174					17,415	805
1909	30,710	1,523	3,537	148					34,247	1,617
1910	111,645	5,505								

a Includes 157 pounds, valued at $6, from China.

XI. SALMON CULTURE.

CALIFORNIA.

HISTORY.

The first fish-cultural station on the Pacific coast was located on McCloud River, a stream of the Sierra Nevada Mountains emptying into Pitt River, a tributary to the Sacramento, 323 miles nearly due north of San Francisco. The site on the west bank of the river, about 3 miles above the mouth, was chosen after investigation of a number of places on the Sacramento, by Mr. Livingston Stone, one of America's pioneer fish culturists, and the station was named Baird, in honor of the then Commissioner of Fisheries, Prof. Spencer F. Baird. Although the season had nearly passed when the station was sufficiently advanced to handle eggs, 50,000 eggs were secured, and while 20,000 were lost, owing to the excessive heat, the remaining 30,000 were shipped east, all of which were eventually lost but 7,000 fry, which were planted in the Susquehanna River, in Pennsylvania.

The main object of the hatchery the first few years was to secure eggs to ship to the East for the purpose of introducing Pacific salmon in the waters in that section. The Commission early made an agreement with the State of California, however, under which the latter at first paid part of the expense, and the Commission hatched and planted a portion of the take in the McCloud River. Later, part of the eggs were turned over to the State, which hatched and planted the salmon in local waters.

In 1881 the station buildings were washed away in a freshet, but were immediately rebuilt. From 1884 to 1887, both inclusive, all operations were suspended.

In 1889 a hatchery was established at Fort Gaston, on the Army reservation in the Hoopa Indian Reservation in Humboldt County, but it was not put into operation until 1890. As the reservation was abolished on July 1, 1892, the Commission took complete charge of the plant, and in 1893 established a tributary station on Redwood Creek. The same year Korbel station was established about one-half mile above Korbel, on Mad River, in Humboldt County. Owing to the lack of money this station was closed in the fiscal year 1896, but was reopened during the fiscal year 1897.

That same year the Commission erected, on ground owned by the State, a hatchery at Battle Creek, in Tehama County, and also took charge of and operated the hatchery erected at this place by the State fish commission the previous year. Under the terms of an

agreement the Commission was to deliver to the State as many eyed spawn as the latter could hatch at Sisson, its own station.

Owing to their inaccessibility, the Fort Gaston hatchery and its substations were abandoned in 1898. The same year an experimental station was established at Olema, Bear Valley, in Marin County, whence eggs were transferred from Baird station, hatched out here, and planted in Olema Creek in order to see if they could not be domesticated here, where they had not been found previously.

During the fiscal year 1902 a substation was established on Mill Creek, a stream which has its source in the foothills of the Sierra Mountains, in the northeastern part of Tehama County, and empties into the Sacramento River from the east about a mile above the town of Tehama. The eggs are retained here until eyed and then shipped to other hatcheries.

As stated above, the State aided the work of the United States Fish Commission in a financial way and also by hatching and distributing the eggs turned over to its care. In 1885 the State legislature passed a bill authorizing the establishment of a hatchery of its own, and the same year such a station was built upon Hat Creek about 2½ miles above its junction with Pitt River, a tributary of the Sacramento River. As the work of the first few seasons developed that the location was unsuitable, the hatchery was removed in 1888 to Sisson, in Siskiyou County. The work of this hatchery was to handle the eggs turned over to it by the United States Fish Commission.

In 1895 another hatchery was built by the State near the mouth of Battle Creek, a tributary of the Sacramento River. In 1896 and 1897 this hatchery was operated jointly by the State and the United States Fish Commission while awaiting the appropriation of money by the Commission to purchase it from the State.

In the fall of 1897 a hatchery was established by the State on Price Creek, a tributary of Eel River, in Humboldt County, and in 1902 this hatchery made the first plant in the State of steelhead trout fry.

Santa Cruz County has had a hatchery at Brookdale for a number of years.

OUTPUT.

The following tables show separately the quantity of eggs, fry, etc., distributed by the United States Fish Commission and the State since the inception of the work. The large quantity of eggs shown by the Commission represents largely the eggs supplied to the State, which hatched and distributed them, and eggs sent to other States and to foreign countries.

Output of Hatcheries Owned by the United States Bureau of Fisheries.

Year ending June 30[a]—	Chinook.		Silver fry.	Steelhead trout.		Total.	
	Eggs.	Fry.		Eggs.	Fry.	Eggs.	Fry.
1872	30,000					30,000	
1873	1,400,000					1,400,000	
1874	4,155,000	850,000				4,155,000	850,000
1875	6,250,000	1,750,000				6,250,000	1,750,000
1876	5,065,000	1,500,000				5,065,000	1,500,000
1877	4,983,000	2,000,000				4,983,000	2,000,000
1878	7,810,000	2,500,000				7,810,000	2,500,000
1879	4,250,000	2,300,000				4,250,000	2,300,000
1880	3,800,000	2,000,000				3,800,000	2,000,000
1881	4,300,000	3,100,000				4,300,000	3,100,000
1882		3,991,750					3,991,750
1883		776,125					776,125
1889[b]	3,450,000	1,500,000				3,450,000	1,500,000
1890	1,554,000	84,000				1,554,000	84,000
1891	2,988,000	777,000				2,988,000	777,000
1892	2,902,000	315,500				2,902,000	315,500
1893	3,530,000	1,190,100				3,530,000	1,190,100
1894	7,500,000	438,500	280,000	75,000	308,500	7,575,000	1,027,000
1895	3,676,000	500,000	[c]1,250,000		[d]1,184,500	3,676,000	2,934,500
1896	6,170,800	715,700		175,000	107,808	6,345,800	823,508
1897	18,232,590	3,056,701	298,137	50,000	257,000	18,282,590	3,611,838
1898	30,605,000	15,643,300		60,000	650,000	30,665,000	16,293,300
1899	27,665,000	3,275,110				27,665,000	3,275,110
1900	2,925,000	3,533,950				2,925,000	3,533,950
1901	3,934,036	889,570				3,934,036	889,570
1902	17,580,410	2,115,560				17,580,410	2,115,560
1903	11,275,777	1,618,066				11,275,777	1,618,066
1904	64,598,354	2,350,130				64,598,354	2,350,130
1905	96,025,765	7,561,380				96,025,765	7,561,380
1906	107,905,945	[e]3,496,405				107,905,945	3,496,405
1907	73,376,315	2,512,250				73,376,315	2,512,250
1908	64,990,550	4,780,855				64,990,550	4,780,855
1909	32,278,265	3,590,078				32,278,265	3,590,078
1910	30,539,467	2,286,257				30,539,467	2,286,257
Total	655,746,274	82,998,287	1,828,137	360.000	2,507,808	656,106,274	87,334,232

[a] The calendar year was used up to 1889.
[b] The hatchery was closed from 1884 to 1888.
[c] Includes 560,000 fingerlings, yearlings, or adults.
[d] Includes 332,000 fingerlings, yearlings, or adults.
[e] Includes 138 fingerlings, yearlings, or adults.

Output of Hatcheries Owned by the State of California.

Year.	Chinook.		Steel-head fry.	Total.	
	Eggs.	Fry.[a]		Eggs.	Fry.
1873		520,000			520,000
1874		850,000			850,000
1875	[b]250,000	2,250,000		250,000	2,250,000
1876		2,000,000			2,000,000
1877		2,200,000			2,200,000
1878		2,500,000			2,500,000
1879		2,300,000			2,300,000
1880		2,225,000			2,225,000
1881		2,420,000			2,420,000
1882		3,991,750			3,991,750
1884		600,000			600,000
1886		150,000			150,000
1887		200,000			200,000
1888		1,290,000			1,290,000
1889		2,168,000			2,168,000
1890		1,320,000			1,320,000
1891		2,798,000			2,798,000
1892		2,651,000			2,651,000
1893		3,941,650			3,941,650

[a] The greater part of the output of chinook fry was from eggs supplied by the United States Bureau of Fisheries hatcheries in California.
[b] All were lost.

OUTPUT OF HATCHERIES OWNED BY THE STATE OF CALIFORNIA—Continued.

Year.	Chinook.		Steel-head fry.	Total.	
	Eggs.	Fry.		Eggs.	Fry.
1894		7,776,400			7,776,400
1895		3,435,000			3,435,000
1896		15,283,183			15,283,183
1897		18,123,000			18,123,000
1898		31,476,388			31,476,388
1899		21,234,000			21,234,000
1900		2,536,000			2,536,000
1901		3,239,000			3,239,000
1902		16,852,040	301,000		17,153,040
1903		20,040,487	120,000		20,160,487
1904		63,632,000	90,000		63,722,000
1905		87,000,000	108,000		87,108,000
1906		105,815,920	243,000		106,058,920
1907		71,267,000	352,000		71,619,000
1908		60,619,000	170,000		60,789,000
1909		28,000,000	517,000		28,517,000
1910		28,469,745	667,800		29,137,545
Total	250,000	621,174,563	2,568,800	250,000	623,743,363

DISTRIBUTION.

The following table shows, by streams and species, the distribution in California of the eggs, fry, etc., from the hatcheries of the United States Fish Commission and the State. This far from represents the work of the hatcheries, as large quantities of eggs were sent to other States and foreign countries.

DISTRIBUTION OF SALMON EGGS, FRY, ETC., IN THE WATERS OF CALIFORNIA.

Year.	Klamath River and tributaries.				Redwood Creek and tributaries.			
	Chinook.		Silver.		Chinook.	Silver.		Steel-head.
	Fry.	Year-lings.	Fry.	Adults and year-lings.	Fry.	Fry.	Adults and year-lings.	Fry.
1890	90,000							
1891	30,000				25,000			
1892	147,600	25,000			142,500			
1893	487,200				170,000			
1895			300,000	160,000		140,000	400,000	
1896					65,700			107,808
1897					280,250	124,750		202,000
1898	16,000				1,260,000			650,000
1903	40,000							
Total	810,800	25,000	300,000	160,000	1,943,450	264,750	400,000	959,808

Distribution of Salmon Eggs, Fry, etc., in the Waters of California—Con.

Year.	Mad River and North Fork.			Eel River.		Russian River.	Skaggs Springs.	Marin County creeks.
	Chinook.	Silver.	Steelhead.	Chinook.	Steelhead.	Chinook.	Chinook.	Chinook.
	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.
1881						15,000	15,000	
1894		280,000	308,500					
1895		470,000						
1897	145,365	173,387	60,000					635,000
1898				7,857,388				1,970,000
1899				8,202,000				900,000
1900				885,000				
1902				2,069,500	301,000			
1903				5,257,947	120,000			
1904				5,200,000	90,000			
1905				8,100,000				
1906				9,265,920	243,000			
1907				7,570,000	352,000	25,000		25,000
1908				6,154,000				
1909				5,500,000	349,000			
Total	145,365	923,387	368,500	66,061,755	1,455,000	40,000	15,000	3,530,000

Year.	Sacramento River and tributaries.				San Francisco Bay streams	San Gregorio River.	Pescadero Creek.	Monterey Bay and tributaries.
	Chinook.			Steelhead.	Chinook.	Chinook.	Chinook.	Chinook.
	Eggs.	Fry.	Yearlings, fingerlings, and adults.	Fry.	Fry.	Fry.	Fry.	Fry.
1873	20,000	520,000						
1874		850,000						
1875	[a] 250,000	2,000,000						
1876		2,000,000						
1877		2,200,000						
1878		2,500,000						
1879		2,300,000						
1880		2,225,000						
1881		2,300,500			20,000	15,000	15,000	30,000
1882	80,300	3,991,750						
1884		600,000						
1886		150,000						
1887		200,000						
1888		1,290,000						
1889		3,668,000						
1890		1,404,000						
1891		3,520,000						
1892		2,676,500						
1893		4,474,750						
1894		8,214,900		45,000				
1895		3,935,000						
1896		15,683,183	250,000					
1897		19,264,086						
1898		33,998,300						
1899	85,200	16,307,110						
1900		5,184,950						
1901		4,128,570						
1902		16,898,100						
1903		16,359,606						
1904		60,782,130						
1905		94,561,380		108,000				
1906		100,038,552						900,000
1907		66,209,250		135,000				1,200,000
1908		59,245,855		170,000				800,000
1909		26,090,000		168,000				
Total	435,500	585,771,472	250,000	626,000	20,000	15,000	15,000	2,930,000

[a] All were lost.

DISTRIBUTION OF SALMON EGGS, FRY, ETC., IN THE WATERS OF CALIFORNIA—Con.

Year.	Monterey Bay and tributaries.		Truckee River.	Total.					
	Silver.	Steelhead.	Chinook.	Chinook.			Silver.		Steelhead.
	Fry.	Fry.	Fry.	Eggs.	Fry.	Yearlings, fingerlings, and adults.	Fry.	Adults and yearlings.	Fry.
1873				20,000	520,000				
1874					850,000				
1875			250,000	250,000	2,250,000				
1876					2,000,000				
1877					2,200,000				
1878					2,500,000				
1879					2,300,000				
1880					2,225,000				
1881			10,000		2,420,500				
1882				80,300	3,991,750				
1884					600,000				
1886					150,000				
1887					200,000				
1888					1,290,000				
1889					3,668,000				
1890					1,494,000				
1891					3,575,000				
1892					2,966,600	25,000			
1893					5,131,950				
1894					8,214,900		280,000		353,500
1895					3,935,000		910,000	560,000	
1896					15,748,883	250,000			107,808
1897					20,324,701		298,137		262,000
1898					45,101,688				650,000
1899				85,200	25,409,110				
1900					6,072,950				
1901					4,128,570				
1902					18,967,600				301,000
1903					5,297,947				120,000
1904					65,982,130				90,000
1905					102,661,380				108,000
1906					110,204,472				243,000
1907	80,000				75,029,250		80,000		487,000
1908	80,000				66,199,855		80,000		170,000
1909	42,000	1,200			31,590,000		42,000		518,200
Total	202,000	1,200	260,000	435,500	645,201,236	275,000	1,690,137	560,000	3,410,508

OREGON.

HATCHERIES ON COASTAL STREAMS.

Rogue River.—In 1877 Mr. R. D. Hume, who had been packing salmon on this river for some years, erected a hatchery at Ellensburgh. In 1888 the Oregon Legislature appropriated a sum of money for the enlargement and support of this hatchery, Mr. Hume to retain complete control. As the location is on tidewater it is necessary to catch the parent fish and hold them until they are ready to spawn, and in order to do this Mr. Hume had an excavation 32 by 62 feet and 11 feet deep made in the bank of the river. This was lined with concrete 1 foot thick, which, when filled with water, made a pond 30 by 60 feet and 10 feet deep. Over the entire pond he constructed a building which could be closed up so as virtually to

exclude the light. It is supposed that retaining the fish in a dark place aids in keeping them in good physical condition until ready to spawn. The death of Mr. Hume in 1908 may lead to the abandonment of this hatchery, unless the State or Government takes it over.

In 1897 Mr. Hume built and equipped a hatchery on the upper Rogue River at the mouth of Elk Creek, about 26 miles from the town of Central Point, in Jackson County, and, in pursuance of an understanding with the United States Fish Commission, the latter operated then and still continues to operate this plant.

In 1900 the Government established an auxiliary station for the collection of steelhead trout eggs on Elk Creek, about 10 miles above the main station. In 1905 a substation was operated at Grants Pass, while during the fiscal year 1908 substations were operated at Findley Eddy, on the Rogue River, Illinois River, and Applegate Creek, tributaries of the Rogue.

Many of the eggs gathered at the upper Rogue River stations were shipped to Mr. Hume's hatchery, on the lower river, and there hatched out and planted.

Coquille River.—The State formerly had a hatchery on this river, but it was abandoned during the winter of 1902–3. In the winter of 1904–5 a substation was established on one of the tributaries of the Coquille River, about 6 miles from the South Coos River hatchery, and was used in hatching eggs brought to it from the latter place.

Coos River.—A hatchery was built by the State in 1900 on the South Coos River, about 20 miles from the town of Marshfield.

Umpqua River.—In 1900 the State built a hatchery on the north fork of the Umpqua River, near the town of Glide and about 24 miles east of Roseburg. In 1901 a station was established farther up the north fork, at the mouth of Steamboat Creek. After working here two years the station was moved a couple of miles farther up the stream. In 1907 work was resumed again at the original station near Glide, as winter freshets had seriously damaged the upper station.

Siuslaw River.—In 1893 the State erected a hatchery on Knowles Creek, a tributary of the Siuslaw River, about 20 miles above the mouth of the river. It was turned over to the United States Fish Commission to operate, but no fish came up to the hatchery because the fishermen lower down stretched their nets entirely across the river.

In 1897 and 1898 the United States Fish Commission operated a hatchery owned by a Mr. McGuire and located close to Mapleton, about 2 miles below the head of tidewater.

In 1902 the State established an experimental station at the Bailey place, near Meadow post office. In 1907 a permanent station was established by the State on Land Creek fork of the Siuslaw River.

Alsea River.—In 1902 the State established a station on the Willis Vidito place, near the town of Alsea. In 1907 an experimental station was established on this river at the mouth of Rock Creek, about 14 miles above the head of tidewater.

Yaquina River.—In 1902 the State established a hatching station on the Big Elk River, a tributary of Yaquina River, about 3 miles above its confluence with the main river. This station was made permanent the next year.

Tillamook Bay.—In 1902 the State established a station on Wilson River, a tributary of Tillamook Bay, and about 8 miles above tide water. In 1906 the station was removed to the Trask River, a tributary of Tillamook Bay.

DISTRIBUTION.

The following table shows the distribution of fry in the coastal streams of the State by the Government and the State.

DISTRIBUTION OF SALMON FRY IN THE COASTAL STREAMS OF OREGON.

Year ending June 30—	Tillamook Bay and tributaries.			Yaquina River.			Alsea River.	
	Chinook.	Silverside.	Steelhead.	Chinook.	Silverside.	Steelhead.	Chinook.	Silverside.
	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.
1898	19,994							
1901				213,500				
1903	251,875			557,700			67,750	
1904	799,300			3,144,380	985,220			
1905				1,407,470	3,009,075	780,500	1,000,000	1,000,000
1906				816,608	4,178,000	1,033,150	806,938	1,785,351
1907	312,700	2,648,000		1,919,508	1,955,793	376,245		
1908	2,124,000	1,629,000		2,193,043	909,855		199,700	812,300
1909		4,896,000	569,690	485,500	1,006,309			
1910	624,800	3,506,990	2,309,770	324,038	28,815			
Total	4,132,669	12,679,990	2,879,460	11,061,747	12,073,067	2,189,895	2,074,388	3,597,651

Year ending June 30—	Siuslaw River.			Umpqua River.	Coos Bay and tributaries.		
	Chinook.	Silverside.	Steelhead.	Chinook.	Chinook.	Silverside.	Steelhead.
	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.	Fry.
1897	180,000						
1898	440,275						
1899	2,700,000						
1901	213,500			730,000	235,000		
1902	112,000	214,800		1,136,000	2,416,350		
1903	389,239			1,596,213			
1904	822,567			1,399,860	4,079,274		
1905	435,162	311,900		2,654,925	3,877,172		
1906	1,826,531	1,296,732	397,355	4,903,700	2,744,000		
1907	608,949	1,030,486		4,685,900	4,014,400		
1908	729,130	1,127,293		2,378,853	3,000,000		
1909	191,267	1,092,540	98,243	4,093,848	2,084,500	1,032,000	222,000
1910	273,352	25,289		5,686,273	1,683,738		
Total	8,921,972	5,099,040	495,598	29,265,572	24,134,434	1,032,000	222,000

DISTRIBUTION OF SALMON FRY IN THE COASTAL STREAMS OF OREGON—Continued.

Year ending June 30—	Coquille River.		Rogue River and tributaries.			
	Chinook.	Silverside.	Chinook.		Silverside.	Steelhead.
	Fry.	Fry.	Fry.	Yearlings, fingerlings, and adults.	Fry.	Fry.
1877			50,000			
1898			1,910,045			
1900			2,156,945			
1901	235,000		2,967,058		128,000	65,850
1902			4,750,763		424,530	20,250
1903	3,084,577		3,480,300		680,800	
1904	1,000,000		9,023,428			8,073
1905	2,210,000		4,758,653		1,250,432	531,000
1906	2,978,700		47,500	75,000		12,625
1907	2,840,000		5,880,290		1,375,000	105,300
1908	2,450,000	226,600	6,597,027	170,051	158,000	937,680
1909		1,185,800	771,710		643,000	878,847
1910			1,430,292			89,850
Total	14,798,277	1,412,400	43,824,011	245,051	4,659,762	2,649,475

Year ending June 30—	Total.			
	Chinook.		Silverside.	Steelhead.
	Fry.	Yearlings, fingerlings, and adults.	Fry.	Fry.
1877	50,000			
1897	180,000			
1898	2,370,314			
1899	2,700,000			
1900	2,156,945			
1901	4,594,058		128,000	65,850
1902	8,415,113		639,330	20,250
1903	9,427,654		680,800	
1904	20,268,809		985,220	8,073
1905	16,343,382		5,571,407	1,311,500
1906	14,123,977	75,000	7,260,083	1,443,130
1907	20,261,747		7,009,279	481,545
1908	19,671,753	170,051	4,863,048	937,680
1909	7,626,825		9,855,649	1,768,780
1910	10,022,493		3,561,094	2,399,620
Total	138,213,070	245,051	40,553,910	8,436,428

The following tables show the total output of the hatcheries in Oregon owned by the United States Bureau of Fisheries and the State of Oregon:

OUTPUT OF HATCHERIES OWNED BY THE UNITED STATES BUREAU OF FISHERIES.

Year ending June 30—	Chinook.			Silver.		
	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
1889		4,500,000				
1890	1,000,000	2,776,475				
1891	700,000	4,901,525				
1892		1,332,400				
1893		4,100,000				
1894		213,000				
1895	23,000					
1896		a 2,832,150	b 557,150			
1897		4,922,634				
1898		16,915,512				
1899	27,000	4,300,200				
1900	1,800,000	4,126,367			146,824	
1901	1,100,000	1,669,857	1,668		128,000	
1902	1,866,061	11,587,061			424,530	
1903	4,884,400	5,453,860	250	680,800		
1904	3,113,000	15,270,675				
1905	30,000	9,822,636			1,250,432	
1906	28,200	2,454,371	122,980			300
1907	1,661,390	8,542,104				
1908	2,045,000	7,844,827	627,856		158,000	57,932
1909	3,531,000	5,021,655	2,763		1,799,915	
1910	3,953,992	4,220,197	225			
Total	25,762,982	122,807,506	1,312,892	680,800	3,907,701	58,232

Year ending June 30—	Steelhead trout.			Total.		
	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
1889					4,500,000	
1890				1,000,000	2,776,475	
1891				700,000	4,901,525	
1892					1,332,400	
1893					4,100,000	
1894					213,000	
1895				23,000		
1896					2,832,150	557,150
1897					4,922,634	
1898					16,915,512	
1899	159,000	12,125		186,000	4,312,325	
1900	415,000	99,000		2,215,000	4,372,191	
1901	246,000	65,850	25,000	1,346,000	1,863,707	26,668
1902	481,000	20,250		2,347,000	12,031,841	
1903	400,000	262,700	62,033	5,965,200	5,716,560	62,283
1904		23,205	11,090	3,113,000	15,293,880	11,090
1905	50,000	534,000		80,000	11,607,068	
1906	10,000	1,294,485	40,383	38,200	3,748,856	163,663
1907	50,000	105,300		1,711,390	8,647,404	
1908	263,725	952,680		2,308,725	8,955,507	685,788
1909	51,468	1,374,308		3,582,468	8,195,878	2,763
1910		2,074,188		3,953,992	6,294,385	225
Total	2,126,193	6,818,091	138,506	28,569,975	133,533,298	1,509,630

a All but 17,000 of these were from eggs received from the California stations.
b All raised from eggs received from the California stations.

OUTPUT OF HATCHERIES OWNED BY THE STATE OF OREGON.

Year.	Chinook fry.	Silverside fry.	Steelhead trout fry.	Total.
1877	50,000			50,000
1878	79,620			79,620
1879	1,876,500			1,876,500
1880	1,834,290			1,834,290
1881	2,554,290			2,554,290
1888	1,300,000			1,300,000
1889	4,500,000			4,500,000
1890	990,000			990,000
1891	[a] 792,000			792,000
1895	2,500,000			2,500,000
1896	2,500,000			2,500,000
1899	2,700,000			2,700,000
1900	2,500,000		200,000	2,700,000
1901	7,562,000		245,000	7,807,000
1902	11,220,550	7,957,000	256,327	19,433,877
1903	18,502,072	3,288,600	300,850	22,091,522
1904	[b] 48,730,791	3,974,185	143,849	52,848,825
1905	16,393,249	5,509,085	1,495,735	23,398,069
1906	[c] 27,404,596	7,503,655	1,859,696	36,767,947
1907	[d] 25,156,732	6.446,628	376,245	31,979,605
1908	[e] 21,209,394	5,359,709		26,569,103
1909	[f] 20,108,990	9,212,649	1,403,129	30,724,768
1910	[g] 24,169,365	3,631,827	2,364,120	30,165,312
Total	244,634,439	52,883,338	8,644,951	306,162,728

[a] Eggs from which hatched obtained from United States Bureau of Fisheries.
[b] 6,826,540 eggs were obtained from United States Bureau of Fisheries.
[c] 7,714,000 eggs were obtained from United States Bureau of Fisheries.
[d] 3,550,000 eggs were obtained from United States Bureau of Fisheries.
[e] 3,020,000 eggs were obtained from United States Bureau of Fisheries.
[f] 6,581,000 eggs were obtained from United States Bureau of Fisheries.
[g] 6,465,300 eggs were obtained from United States Bureau of Fisheries.

COLUMBIA RIVER AND TRIBUTARIES.

The first fish-cultural work upon the Columbia River and in Oregon was at Clackamas, on the Clackamas River, a tributary of the Willamette River, which empties into the Columbia River about 180 miles from its mouth.

This hatchery was built in 1876 by the Oregon & Washington Fish Propagating Co., which operated it until 1880. In 1887 the State provided for and there was appointed a State fish commission. Almost the first work of the commission was to spend $12,000 appropriated by the legislature to put in repair and operate this hatchery. On July 1, 1888, it was informally turned over to the United States Commission of Fish and Fisheries, which paid over the purchase price, took formal possession in the following winter, and has operated it ever since, with the exception of several years when the building of dams stopped the progress of salmon to the hatchery. During this period a temporary station for the collection of eggs was established on Sandy River, about 15 miles away, and on Salmon River, a tributary of Sandy River, both tributaries of the Columbia River. Some eggs were also brought in from the California hatcheries and hatched at the Clackamas station. In 1901 the hatchery was moved about 4 miles down the river and has since been operated as both a rearing and a collecting station. In 1901 the State established

another hatchery on the Clackamas River about 30 miles below the main station and between the North and South Forks. In 1904 all were turned over to the United States. In 1907 an experimental station for the collection of eggs of the early variety of chinook salmon was established by the State of Oregon on the Clackamas River below the Portland Railway, Light & Power Co.'s dam at Cazadero, but this is now operated by the United States Bureau of Fisheries.

In 1889 the State established a hatchery in the cannery of Mr. F. M. Warren, at Warrendale, in Multnomah County, on the Columbia River, which was operated in that year and in 1890.

In 1895 some of the Oregon salmon packers combined and organized the Columbia River Packers' Propagating Co., which established a hatchery on the upper Clackamas River at the junction of the Warm Springs and the Clackamas and operated it in 1895 and 1896. The Government operated it in 1897 and 1898, after which it was turned over to the State and moved to the opposite side of the river.

In 1898 the collection of steelhead trout eggs was first undertaken on the northwest coast by the State of Oregon on Salmon River, a tributary of the Columbia River, and met with fair success. In March, 1899, the Government sent a party to the falls of the Willamette River, near Oregon City, to collect steelhead eggs, and also operated for this purpose at its substation on the Salmon River, but the latter effort met with failure, as the rack was washed away. This station was turned over to the State on June 15, 1899.

In 1901 the State of Oregon did some experimental work at Swan Falls, on Snake River, the boundary for a considerable distance between Oregon and Idaho. During the winter and early spring of 1902 the State also worked Tucannon River, which is a tributary of Snake River, for steelhead, but met with poor success. Snake River was worked again in 1902 at the foot of Morton Island, which is situated 2 miles above Ontario, in Malheur County. Title to the necessary property was secured from the War Department in 1903 and permanent buildings were erected.

In 1901 the State of Oregon established an experimental hatchery in Wallowa County, on the Grande Ronde River, at the mouth of a small tributary called the Wenaha River, which enters the main stream about 50 miles from its mouth. A permanent station was established in the canyon about 1½ miles below the Wallowa bridge on the Wallowa River, a tributary of the Grande Ronde River, in 1903.

In 1902 the State of Oregon erected a permanent plant on Salmon River at its junction with Boulder Creek.

In the same year the State established an experimental station on the McKenzie River, a tributary of the Willamette River, about

one-half mile above Vida post office. This experimental work was resumed in 1905 at a point 2 miles below Gate Creek. The hatchery was permanently established at a spot about 30 miles from Eugene and near the town of Leaburg a year or two later.

In 1906 an experimental station was established by the State on Breitenbush Creek a short distance above its junction with the Santiam River, a tributary of the Willamette River, but the plant was destroyed very shortly after its establishment, by a forest fire. An experimental station was reestablished here in 1909, but a heavy freshet raised the river so high that the penned fish escaped around the rack.

In 1909 the State of Oregon built at Bonneville, on Tanner Creek, a tributary of the Columbia River, a large central hatchery capable of handling 60,000,000 eggs, it being the intention of the State to hatch at this plant the eggs collected at other stations.

The first entrance of Washington (then a Territory) into fish-cultural operations was in 1879, when the State fish commissioner paid the Oregon & Washington Fish Propagating Co., which was operating the hatchery on the Clackamas River, $2,000 for salmon fry deposited in that river. In 1893 the State legislature established a hatchery fund which was to be supplied by licenses from certain lines of the fishery business. In 1895 its first hatchery in the Columbia River Basin was built on the Kalama River, about 4 miles distant from its junction with the Columbia, and in Cowlitz County. Another station for the collection and eyeing of eggs was established on the Chinook River, a small stream which empties into Baker Bay near the mouth of the Columbia.

During the fiscal year 1897 the United States Fish Commission established a station on Little White Salmon River, a stream which empties into the Columbia, on the Washington side, about 14 miles above the Cascades. During the fiscal year 1901 an auxiliary station was operated on Big White Salmon River, while fishing was carried on in Eagle and Tanner Creeks, in Oregon, the eggs obtained from these creeks being brought to the Little White Salmon hatchery.

In 1899 the State of Washington built and operated hatcheries on the Wenatchee River, a tributary of the Columbia River, about 1½ miles from Chiwaukum station on the Great Northern Railway, and on Wind River, a tributary of the Columbia, about 1 mile from the junction.

In 1900 Washington State hatcheries were established in the Columbia River basin as follows: White River hatchery, which was built on Coos Creek, which empties into a tributary of the White River, the location being about 2½ miles from where the Green River joins the White River; Methow River hatchery, built on the Methow River at the point where it is joined by the Twisp, about

22 miles from the Columbia River; Colville River hatchery, built on the north bank of Colville River, about 1½ miles from its mouth, and about 1 mile from Kettle Falls; Klickitat River hatchery, located on the east bank of the Klickitat River, about 6 miles from its mouth; and one on the Little Spokane River, about 10 miles from its mouth and about 9 miles north of the city of Spokane. The Klickitat River hatchery never was operated, while most of the others were operated intermittently.

In 1906 a hatchery was established by the State of Washington on the Lewis River, some distance above the town of Woodland.

The following table shows the plants of salmon and steelhead trout in the Columbia River and its tributaries by the Bureau of Fisheries and the States of Oregon and Washington:

TABLE SHOWING THE PLANTS OF SALMON FRY IN THE COLUMBIA RIVER BASIN SINCE 1877.

Year ending June 30—	Columbia River and tributaries.			Total.
	Chinook fry.	Silverside fry.	Steelhead trout fry.	
1877	300,000			300,000
1878	79,620			79,620
1879	3,076,500			3,076,500
1880	1,834,290			1,834,290
1881	2,554,290			2,554,290
1888	1,300,000			1,300,000
1889	4,500,000			4,500,000
1890	3,756,475			3,756,475
1891	5,694,000			5,694,000
1892	1,332,400			1,332,400
1893	4,100,000			4,100,000
1894	213,000			213,000
1895	a 2,523,000			2,523,000
1896	b 10,389,300			10,389,300
1897	10,641,394			10,641,394
1898	26,212,074			26,212,074
1899	19,979,241		8,625	19,987,866
1900	22,510,869	7,175,824	299,000	29,985,693
1901	c 24,978,978	5,559,750	245,000	30,783,728
1902	44,328,085	17,545,724	256,327	62,130,136
1903	40,174,313	8,721,720	d 600,583	49,496,616
1904	71,694,587	8,422,085	158,981	80,275,653
1905	17,107,217	1,354,610	e 768,235	19,230,062
1906	f 36,372,785	g 828,872	h 1,769,494	38,971,151
1907	23,171,235	2,657,349	26,640	25,855,224
1908	i 34,852,008	1,705,543	15,000	36,572,551
1909	j 33,098,943	2,439,415	k 1,058,657	36,597,015
1910	l 37,744,002	3,374,733	m 2,063,688	43,182,423
Total	484,518,606	59,785,625	7,270,230	551,574,461

a Includes 23,000 eggs.
b Includes 557,150 yearlings, fingerlings, or adults.
c Includes 1,668 yearlings, fingerlings, or adults.
d Includes 37,033 yearlings, fingerlings, or adults.
e Includes 50,000 eggs.
f Includes 48,200 eggs and 47,980 yearlings, fingerlings, or adults.
g Includes 300 yearlings, fingerlings, or adults.
h Includes 24,383 yearlings, fingerlings, or adults, and 58,000 eggs.
i Includes 1,995,746 yearlings, fingerlings, or adults.
j Includes 16,949 yearlings, fingerlings, or adults.
k Includes 50,000 eggs.
l Includes 225 yearlings, fingerlings, or adults.
m Includes 25,000 eggs.

WASHINGTON.

Willapa River.—In 1899 Washington established a hatchery on Trap Creek, a tributary of the Willapa River, situated about 200 yards from the creek's mouth.

Chehalis River.—The construction of a hatchery on the Chehalis River, about 4 miles above the city of Montesano, was begun by the State in October, 1897, but owing to bad weather and extreme high water was not completed until late in 1898. The hatchery was a failure until 1902 when a fair season was had, as was again true in 1903. It was not operated in 1904. Since the State began taking eggs from the Satsop River, a tributary of the Chehalis, it has been possible to fill the hatchery each season.

Puget Sound and tributaries.—In 1896 the State established a hatchery on Baker Lake, which is the head of Baker River, a tributary of the Skagit River, and this was the first establishment for the hatching of sockeye salmon. In July, 1899, it was sold to the United States Fish Commission. In 1901 steelhead trout eggs were collected on Phinney Creek, about 5 miles from the town of Birdsview, and some 30 miles from Baker Lake. In 1901 an auxiliary station was opened at Birdsview, on Skagit River, and steelhead trout eggs were collected on Phinney and Grandy Creeks and brought to Baker Lake to be hatched.

In 1898 a private hatchery (the necessary money being raised by subscription among the residents of Fairhaven, now Bellingham, and vicinity) was built near Lake Samish, a few miles from Fairhaven.

In 1899 a hatchery was built by the State on Kendall Creek, a tributary of the Nooksack River, about 300 yards from same, and about 2 miles from the railway station of Kendall. Except in 1903, this hatchery has since been operated continuously. An eyeing station was built in 1907 on the south fork of the Nooksack River, about 1 mile from Acme.

In the same year the State built a hatchery on the Skokomish River, about 4 miles from its mouth. An eyeing station was also erected on the north fork of the same river. The main station was not operated in 1904 and only on a small scale in 1903 and 1905.

The State in 1899 built a hatchery on Friday Creek, a tributary of the Samish River, situated about 1 mile from the mouth of the creek.

The following State hatcheries were first operated in 1900. Snohomish hatchery, built on the west bank of the Skykomish River, a few miles from its mouth; Nisqually River hatchery, built on Muck Creek, about one-half mile from the Nisqually River, and about 4 miles from the town of Roy, in Pierce County; and the Stillaguamish hatchery, located on the Stillaguamish River, about 4 miles from the

town of Arlington, in Snohomish County. The latter has since been moved to Jim Creek, a tributary of the south branch of the Stillaguamish River.

The Startup hatchery, located near Startup, on the Skykomish River, was formerly used as a collecting station for the Snohomish hatchery. It is still used for this purpose, but also retains and hatches a considerable quantity of spawn. The station is about 4 miles from the Snohomish hatchery.

In 1900 the State established a fisheries experimental station at Keyport Landing, on the east arm of Port Orchard Bay, with Pearson as the nearest post office. The work of the station is devoted to salmon and oysters.

The State established a hatchery on the Dungeness River, about 7 miles from the town of Dungeness, in Clallam County, in 1901. In 1906 it constructed a hatchery on a small tributary of the Skagit River, between Hamilton and Lyman. The station built on Sauk River, a tributary of the Skagit, has been operated only occasionally since the Skagit hatchery was built.

The United States Bureau of Fisheries has now (1911) under construction hatcheries on the Duckabush and Quilcene Rivers in Hoods Canal.

The following tables show the total output of the salmon hatcheries in the State of Washington owned by the United States Bureau of Fisheries and the hatcheries owned by the State itself:

OUTPUT OF THE SALMON HATCHERIES IN WASHINGTON OWNED BY THE UNITED STATES BUREAU OF FISHERIES.

Year ending June 30—	Chinook.			Sockeye, or blueback.			Silver.	
	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Eggs.	Fry.
1897		1,848,760						
1898		7,391,886						
1899	4,926,000	1,791,056						
1900	2,686,000	6,626,947			10,683,000			
1901	6,581,000	5,427,680			3,834,453			174,041
1902		15,637,687			3,371,000			
1903		16,774,030			3,731,789			81,812
1904	7,506,000	17,386,183			3,855,000			3,984,645
1905		4,236,276			7,819,281	10,000	107,000	8,071,081
1906	7,714,000	14,846,905		880,000	3,285,130	9,500	239,180	6,445,574
1907	3,550,000	6,512,738			4,224,255		760,000	3,636,952
1908	1,485,000	12,372,503	1,537,941	75,000	8,514,305		296,000	13,262,714
1909	3,050,000	11,565,553	14,186	100,000	5,430,626		272,000	7,661,110
1910	3,813,250	9,175,610			4,554,825		275,000	10,888,025
Total	41,311,250	131,593,814	1,552,127	1,055,000	59,303,664	19,500	1,949,180	54,205,954

Output of the Salmon Hatcheries in Wash ngton Owned by the United States Bureau of Fisheries—Continued.

Year ending June 30—	Humpback.		Steelhead trout.			Total.		
	Eggs.	Fry.	Eggs.	Fry.	Finger-lings, yearlings, and adults.	Eggs.	Fry.	Finger-lings, yearlings, and adults.
1897							1,848,760	
1898							7,391,886	
1899						4,926,000	1,791,056	
1900				26,000		2,686,000	17,335,947	
1901						6,581,000	9,436,174	
1902				110,000			19,118,687	
1903			80,000	440,000	223,815	80,000	21,027,631	223,815
1904		176,597	255,000	70,000		7,761,000	25,472,425	
1905			414,400	3,205		521,400	20,129,843	10,000
1906	2,000	969,990	348,000	540,000		9,183,180	26,087,599	9,500
1907			200,000	941,505		4,510,000	15,315,450	
1908	502,000	6,764,762	224,000	136,916		2,582,000	41,051,200	1,537,941
1909			220,000	717,691		3,642,000	25,374,980	14,186
1910		1,368,000	300,000	1,437,038		4,388,250	27,423,498	
Total	504,000	9,279,349	2,041,400	4,422,355	223,815	46,860,830	258,805,136	1,795,442

Output of the Salmon Hatcheries Owned by the State of Washington.

Year ending June 30—	Chinook fry.	Dog fry.	Hump-back fry.	Silverside, or coho, fry.	Sockeye, or blue-back, fry.	Steelhead trout fry.	Total.
1896	4,500,000						4,500,000
1897	4,050,000				5,500,000		9,550,000
1898	4,275,000				5,400,000		9,675,000
1899	8,595,000			189,000			8,784,000
1900	12,251,600	10,301,760		13,778,280		1,736,560	38,068,200
1901	12,275,400	16,478,280		19,747,894		1,398,476	49,900,050
1902	14,766,822	9,937,390		32,964,593		2,481,371	60,150,176
1903	14,283,499	9,937,390		28,659,079		3,134,076	56,014,044
1904	13,261,184		295,200	15,725,196		3,868,866	33,150,446
1905	7,101,180			12,226,294		2,433,635	21,761,109
1906	10,943,550	3,268,800		28,906,380		2,769,784	45,888,514
1907	8,897,670	6,120,000		28,668,600		3,575,943	47,262,213
1908	18,647,600	4,342,350	2,655,900	29,273,202		4,578,075	59,497,127
1909	17,440,950	8,218,000		24,543,200		4,080,450	54,282,600
1910	21,168,350	8,607,500	519,600	30,894,100		4,855,000	66,044,550
Total	172,457,805	77,211,470	3,470,700	265,575,818	10,900,000	34,912,236	564,528,029

NOTE.—As the printed reports of the State in many instances report as the output the number of eggs gathered, it has been necessary in such cases to make an arbitrary reduction from these figures, in order to allow for the loss in the egg stage.

The following table shows the plantings made in waters of Washington other than the Columbia River by the United States Bureau of Fisheries and the State of Washington:

PLANTS OF SALMON FRY IN THE WATERS OF WASHINGTON OTHER THAN THE COLUMBIA RIVER.

Year ending June 30—	Puget Sound and tributaries.					
	Chinook.	Sockeye.	Silver, or coho.	Hump-back.	Dog.	Steelhead.
1897		5,500,000				
1898		5,400,000				
1899	7,470,000		189,000			
1900		10,683,000	6,749,280		10,301,760	1,572,560
1901	300,000	3,834,453	14,360,185		16,478,280	1,398,476
1902	2,141,322	3,371,000	23,161,069		9,937,390	2,591,371
1903	2,113,850	3,731,789	21,507,771		9,937,390	[a] 3,326,091
1904	1,865,933	3,855,000	14,071,845	471,797		3,518,476
1905	2,590,738		16,441,375			[b] 1,329,940
1906	4,819,290	[c] 3,582,630	[d] 29,770,414	969,990	1,800,000	[e] 3,177,174
1907	3,907,598		26,960,552	4,224,255	5,220,000	3,964,308
1908	8,356,709	8,514,305	37,613,466	9,420,662	2,278,350	4,566,491
1909	9,647,288	5,430,626	28,622,310		6,048,000	[f] 4,499,141
1910	11,681,060	4,554,825	36,837,125	1,887,600	7,748,500	6,292,338
Total	54,893,788	58,457,628	256,284,392	16,974,304	69,749,670	36,236,366

Year ending June 30—	Chehalis River.			Willapa River.		
	Chinook.	Silver, or coho.	Dog.	Chinook.	Silver, or coho.	Steelhead.
1899	1,215,000					
1900	2,355,300			881,000		190,000
1901	1,909,800			653,400		
1903				2,163,019	1,800,000	500,000
1904	900,000			819,504	204,876	420,390
1905				630,000	1,800,000	288,000
1906		2,563,380	1,468,800	529,650	2,160,000	171,550
1907		2,250,000	900,000	393,660	2,250,000	526,500
1908	163,000	3,275,000	2,064,000	678,600	654,500	148,500
1909	148,000	1,800,000	1,757,000	322,200	504,000	399,000
1910	403,000	1,577,000	859,000	455,200	64,000	
Total	7,094,100	11,465,380	7,048,800	7,526,233	9,437,376	2,643,940

Year ending June 30—	Total by species.						Grand total.
	Chinook.	Sockeye.	Silver, or coho.	Hump-back.	Dog.	Steelhead.	
1878	[g] 3,000						3,000
1897		5,500,000					5,500,000
1898		5,400,000					5,400,000
1899	8,685,000		189,000				8,874,000
1900	3,236,300	10,683,000	6,749,280		10,301,760	1,762,560	32,732,900
1901	2,863,200	3,834,453	14,360,185		16,478,280	1,398,476	38,934,594
1902	2,141,322	3,371,000	23,161,069		9,937,390	2,591,371	41,202,152
1903	4,276,869	3,731,789	23,307,771		9,937,390	3,826,091	45,079,910
1904	3,585,437	3,855,000	14,276,721	471,797		3,938,866	26,127,821
1905	3,220,738		18,241,375			1,617,940	23,080,053
1906	5,348,940	3,582,630	34,493,794	969,990	3,268,800	3,348,724	51,012,878
1907	4,301,258		31,460,552	4,224,255	6,120,000	4,490,808	50,596,873
1908	9,198,309	8,514,305	41,542,966	9,420,662	4,342,350	4,714,991	77,733,583
1909	10,117,488	5,430,626	30,926,310		7,805,000	4,898,141	59,177,565
1910	12,539,260	4,554,825	38,478,125	1,887,600	8,607,500	6,292,338	72,359,648
Total	69,517,121	58,457,628	277,187,148	16,974,304	76,798,470	38,880,306	537,814,977

[a] Of these, 218,200 were yearlings, fingerlings, or adults.
[b] Of these, 14,400 were eggs.
[c] Of these, 9,500 were yearlings, fingerlings, or adults.
[d] Of these, 14,840 were yearlings, fingerlings, or adults.
[e] Of these, 15,000 were yearlings, fingerlings, or adults.
[f] Includes 100,000 eggs.
[g] These were brought from the Clackamas (Oregon) station and planted in some unnamed lake.

BRITISH COLUMBIA.

Fraser River.—The first hatchery established by the Dominion of Canada on the Pacific coast was erected in 1884 at what is now Bon Accord, a point on the lower river some 4 miles above New Westminster, and on the opposite shore. The next built was in 1901 on Granite Creek, Shuswap Lake, which discharges into the Fraser through the South Thompson River, the lake being about 280 miles from New Westminster. In 1904 another hatchery was established on Harrison Lake on the Lillooet River, first large tributary of the Fraser on the north side; also one about 4 miles east of the lower extremities of Pemberton Meadows, at the junction of Owl Creek and the Birkenhead River, 4 miles above its confluence with the eastern branch of the Lillooet River, which in turn discharges into Lillooet Lake. In 1907 a hatchery was built on Stuart Lake, near the headwaters of the Fraser.

The Province of British Columbia owns Seton Lake Hatchery, which was established in 1903 on Lake Creek, on the north side, about half a mile from the outlet of Seton Lake, and it has been operated continuously ever since. Seton Lake is a part of the Fraser River chain and is some 300 miles above the mouth of the river. Lake Creek, the outlet of Seton Lake, empties into the Cayoosh Creek, a tributary of the Fraser, 45 miles north of the latter's junction with the Thompson, and 1 mile south of the town of Lillooet.

Nimpkish River.—In 1902 Mr. S. A. Spencer, of the Alert Bay cannery (now belonging to the British Columbia Packers' Association), in return for certain special fishery privileges granted by the Dominion, established a hatchery on this river, which is located on the northeast shore of Vancouver Island. The hatchery was burned down in 1903, but was immediately rebuilt. Since its establishment it has been operated by the Dominion.

Rivers Inlet.—A hatchery was established by the Dominion on McTavish Creek, one of the tributaries of Oweekayno Lake, about 20 miles up Rivers Inlet, in 1905, and has been operated ever since.

Skeena River.—In 1902 the Dominion established a hatchery on Lakelse Lake, in the Skeena River basin, about 65 miles up the river from Port Essington. In 1907 another was constructed on Babine Lake, the source of the Skeena River.

The following table shows the plantings made in the waters of British Columbia from the Dominion and provincial hatcheries:

PLANTS OF SALMON FRY MADE IN THE WATERS OF BRITISH COLUMBIA.

Year.	Fraser River.						
	Dog.	Coho.	Spring, or king.	Humpback.	Sockeye.	Steelhead trout.	Total.
1885					1,800,000		1,800,000
1886					2,625,000		2,625,000
1887					4,414,000		4,414,000
1888					5,807,000		5,807,000
1889					4,419,000		4,419,000
1890					6,640,000		6,640,000
1891					3,603,800		3,603,800
1892					6,000,000		6,000,000
1893					5,674,000		5,674,000
1894					6,300,000		6,300,000
1895					6,390,000		6,390,000
1896					10,393,000		10,393,000
1897					5,928,000		5,928,000
1898					5,850,000		5,850,000
1899					4,742,000		4,742,000
1900					6,200,000		6,200,000
1901					[No fish.]		
1902		90,000			15,808,000	75,000	15,973,000
1903	75,000	1,750,000	22,000		12,521,000		14,368,000
1904		210,000		50,000	13,729,200	12,000	14,001,200
1905		5,576,100	4,381,400		9,244,300		19,201,800
1906		4,774,000	1,791,500		100,479,000	4,000	107,048,500
1907		3,219,200	1,814,900		36,965,900		42,000,000
1908		5,890,000	2,815,000	22,500,000	51,855,200		83,060,200
1909		7,375,400	5,772,400		41,909,500		55,057,300
1910		450,000	6,300,000		105,312,500		112,062,500
Total	75,000	29,334,700	22,897,200	22,550,000	474,610,400	91,000	549,558,300

Year.	Skeena River.	Rivers Inlet.			Nimpkish River.
	Sockeye.	Sockeye.	Spring, or king.	Total.	Sockeye.
1903	3,450,000				1,636,000
1904	4,000,000				2,496,000
1905	3,767,900				2,850,000
1906	3,784,450	8,000,000		8,000,000	4,873,400
1907	4,125,750	8,440,000		8,440,000	4,870,000
1908	8,946,950	8,594,000	4,706,000	13,300,000	4,800,000
1909	11,882,400	13,300,000		13,300,000	4,500,000
1910	[a] 11,521,700	12,750,000		12,750,000	5,055,000
Total	51,479,150	51,084,000	4,706,000	55,790,000	31,080,400

[a] Includes 80,000 coho fry.

PLANTS OF SALMON FRY MADE IN THE WATERS OF BRITISH COLUMBIA—Con.

Year.	Total by species.						Grand total.
	Dog.	Coho.	Spring, or king.	Hump-back.	Sockeye.	Steel-head trout.	
1885					1,800,000		1,800,000
1886					2,625,000		2,625,000
1887					4,414,000		4,414,000
1888					5,807,000		5,807,000
1889					4,419,000		4,419,000
1890					6,640,000		6,640,000
1891					3,603,800		3,603,800
1892					6,000,000		6,000,000
1893					5,674,000		5,674,000
1894					6,300,000		6,300,000
1895					6,390,000		6,390,000
1896					10,393,000		10,393,000
1897					5,928,000		5,928,000
1898					5,850,000		5,850,000
1899					4,742,000		4,742,000
1900					6,200,000		6,200,000
1902		90,000			15,808,000	75,000	15,973,000
1903	75,000	1,750,000	22,000		17,607,000		19,454,000
1904		210,000		50,000	20,225,200	12,000	20,497,200
1905		5,576,100	4,381,400		15,862,200		25,819,700
1906		4,774,000	1,791,500		117,136,850	4,000	123,706,350
1907		3,219,200	1,814,900		54,401,650		59,435,750
1908		5,890,000	7,521,000	22,500,000	74,196,150		110,107,150
1909		7,375,400	5,772,400		71,591,900		84,739,700
1910		450,000	6,300,000		134,639,200		141,389,200
Total	75,000	29,334,700	27,603,200	22,550,000	608,253,950	91,000	687,907,850

ALASKA.

In 1891 several of the canneries operating at Karluk, on Kodiak Island, combined forces and built a hatchery on the lagoon at that place. As the cannery men were at swords' points in regard to their fishing rights on the spit, in 1892 the hatchery was closed. In May, 1896, the Alaska Packers' Association broke ground for a hatchery at the eastern end of the lagoon, near the outlet of Karluk River, a short distance from where the hatchery was located in 1891, and has operated this plant ever since.

In 1892 Capt. John C. Callbreath, manager of the Point Ellis cannery, on Kuiu Island, operated a small hatchery on the left bank of Kutlakoo stream. It was a very primitive place, and an exceptionally high tide destroyed the whole plant in September. It was never rebuilt.

Capt. Callbreath, however, after seeing to the operation of the hatchery, had returned to Wrangell during the summer, where his attention was again attracted to hatchery work, and in the fall of 1892 he built a small hatchery on Jadjeska stream, Etolin Island, about 200 yards from its mouth. The stream is about one-half mile in length and is the outlet of a small lake. Finding the location unsuitable Capt. Callbreath removed the hatchery in 1893 to the northern side of the lake, about three-eighths of a mile from the head of the outlet, where it still stands. The owner's intention was to build up a stream which had a small natural run of red salmon until it had a large run,

with the hope that the Government would then give him the exclusive right to take these fish from the stream for commercial purposes. The experiment was kept up until the end of the season of 1905, when Capt. Callbreath's failing eyesight compelled the cessation of the actual hatching. Since then a man has been stationed on the stream during the run of spawning fish for the purpose of lifting them over the dam, so that they could reach the spawning beds at the head of the lake. The owner's expectation of a big run as a result of hatching operations was never realized.

In 1896 the Baranof Packing Company, which operated a cannery on Redfish Bay, on the western coast of Baranof Island, built a small hatchery on the lake at the head of Redfish stream. The following winter was so cold that not only the flume, but the whole cataract, froze solid, and as the hatchery was thus left without water the eggs were put into the lake and left to their fate and the hatchery closed down permanently.

In 1897 the North Pacific Trading & Packing Company, at Klawak, Prince of Wales Island, established a hatchery near the head of Klawak stream, close to Klawak Lake. In 1898 the plant was moved to the mouth of a small stream entering the lake about halfway up the western shore. This hatchery has been operated continuously ever since. In 1909 the North Alaska Salmon Co. acquired a half interest in it.

The Pacific Steam Whaling Company in 1898 erected a small hatchery on Hetta Lake, on the west side of Prince of Wales Island, which was operated until the close of the hatching season of 1903–4, when the Pacific Packing & Navigation Company, successor to the original owner, went into the hands of a receiver. In 1907 it was reopened by the Northwestern Fisheries Company, which had acquired the interests of the old company, and has been operated each season since.

Up to 1900 the work of hatching salmon was entirely voluntary on the part of the packers. On May 2 of that year the following regulation was promulgated at the Treasury Department, which at that time had control of the Alaska salmon-inspection service:

7. Each person, company, or corporation taking salmon in Alaskan waters shall establish and conduct, at or near the fisheries operated by him or them, a suitable artificial propagating plant or hatchery; and shall produce yearly and place in the natural spawning waters of each fishery so operated red salmon fry in such numbers as shall be equal to at least four times the number of mature fish taken from the said fisheries, by or for him or them, during the preceding fishing season. The management and operation of such hatcheries shall be subject to such rules and regulations as may hereafter be prescribed by the Secretary of the Treasury. They shall be open for inspection by the authorized official of this department; annual reports shall be made, giving full particulars of the number of male and female salmon stripped, the number of eggs treated, the number and percentage of fish hatched, and all other conditions of interest; and there shall be made a sworn yearly statement of the number of fry planted and the exact location where said planting was done.

On January 24, 1902, this regulation was amended so as to require the planting of "red salmon fry in such numbers as shall be equal to at least ten times the number of salmon of all varieties taken from the said fisheries."

Although the regulation was mandatory, but few of the packers obeyed it, some because no suitable place was to be found within a reasonable distance of their plants, others because the establishment and operation of such a hatchery would cost more than their returns from the industry justified, and others because of lack of knowledge required in hatchery work. The greater number of them absolutely ignored it, and as a result those who conformed to the regulation were placed under a heavy financial handicap. The injustice of this arrangement was patent on its face, and in 1906, when a comprehensive revision of the law was made by Congress, provision was made for reimbursing in the future those cannery men who operated salmon hatcheries. The section covering this point reads as follows:

Sec. 2. That the catch and pack of salmon made in Alaska by the owners of private salmon hatcheries operated in Alaska shall be exempt from all license fees and taxation of every nature at the rate of ten cases of canned salmon to every one thousand red or king salmon fry liberated, upon the following conditions:

That the Secretary of Commerce and Labor may from time to time, and on the application of the hatchery owner shall, within a reasonable time thereafter, cause such private hatcheries to be inspected for the purpose of determining the character of their operations, efficiency, and productiveness, and if he approve the same shall cause notice of such approval to be filed in the office of the clerk or deputy clerk of the United States district court of the division of the District of Alaska wherein any such hatchery is located, and shall also notify the owners of such hatchery of the action taken by him. The owner, agent, officer, or superintendent of any hatchery the effectiveness and productiveness of which has been approved as above provided shall, between the thirtieth day of June and the thirty-first day of December of each year, make proof of the number of salmon fry liberated during the twelve months immediately preceding the thirtieth day of June, by a written statement under oath. Such proof shall be filed in the office of the clerk or deputy clerk of the United States district court of the division of the District of Alaska wherein such hatchery is located, and when so filed shall entitle the respective hatchery owners to the exemption as herein provided; and a false oath as to the number of salmon fry liberated shall be deemed perjury and subject the offender to all the pains and penalties thereof. Duplicates of such statements shall also be filed with the Secretary of Commerce and Labor.

It shall be the duty of such clerk or deputy clerk in whose office the approval and proof heretofore provided for are filed to forthwith issue to the hatchery owner, causing such proofs to be filed, certificates which shall not be transferable and of such denominations as said owner may request (no certificate to cover fewer than one thousand fry), covering in the aggregate the number of fry so proved to have been liberated; and such certificates may be used at any time by the person, company, corporation, or association to whom issued for the payment pro tanto of any license fees or taxes upon or against or on account of any catch or pack of salmon made by them in Alaska; and it shall be the duty of all public officials charged with the duty of collecting or receiving such license fees or taxes to accept such certificates in lieu of money in payment of all license fees or taxes upon or against the pack of canned salmon at the ratio of one thousand fry for each ten cases of salmon. No hatchery

owner shall obtain the rebates from the output of any hatchery to which he might otherwise be entitled under this act unless the efficiency of said hatchery has first been approved by the Secretary of Commerce and Labor in the manner herein provided for.

In 1901 the Pacific Steam Whaling Company established two small hatcheries—one on Nagel stream, which enters the northern side of Quadra Lake, on the mainland of southeast Alaska, and one on a stream entering Freshwater Lake Bay, Chatham Strait. Both were closed down in 1904 when the company failed. In 1908 the Northwestern Fisheries Company, which had acquired the Quadra plant, removed it to a small stream entering the head of the lake and has operated it ever since.

In 1901 the Alaska Packers' Association erected a hatchery on Heckman Lake, the third of a series of lakes on Naha stream, Revillagigedo Island, and about 8 miles from Loring, where the association has a cannery. This is without question the largest and costliest salmon hatchery in the world, having a capacity of 110,000,000 eggs, and the association is entitled to great credit for the public spirit it has shown and the work it has done, entirely without remuneration until 1906, in building and operating not only this hatchery but also the one at Karluk.

The Union Packing Company, at Kell Bay, on Kuiu Island, and Mr. F. C. Barnes, at Lake Bay, on Prince of Wales Island, in 1902 built and operated small hatcheries, both of which were abandoned after one season's work.

Up to 1905 the work of hatching salmon in Alaska was confined to the salmon cannery men. In that year, however, the United States Bureau of Fisheries erected a hatchery on Yes Lake, which empties through a short stream into Yes Bay, on Cleveland Peninsula. In 1907 the bureau constructed another hatchery, on Afognak Lake, near Litnik Bay, Afognak Island.

The following tables show the eggs gathered and the fry planted from the government and privately owned hatcheries in Alaska:

Output of the Salmon Hatcheries in Alaska Owned by the United States Bureau of Fisheries, 1906 to 1910.

Year ending June 30—	Yes Lake hatchery.						Afognak hatchery.			
	Red, or sockeye.		Coho, or silver.		Steelhead trout.		Red, or sockeye.		Humpback.	
	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.
1906	7,031,480	6,638,550								
1907	58,210,000	54,610,800			182,000	143,500				
1908	65,550,000	61,369,000								
1909	50,000,000	48,653,000	17,000	9,900			46,380,000	39,325,870	12,000	10,000
1910	72,000,000	69,879,600					76,020,000	71,647,170	499,400	363,740
Total	252,791,480	241,150,950	17,000	9,900	182,000	143,500	122,400,000	110,973,040	511,400	373,740

OUTPUT OF THE SALMON HATCHERIES IN ALASKA OWNED BY THE UNITED STATES BUREAU OF FISHERIES, 1906 TO 1910—Continued.

Year ending June 30—	Total by species.								Grand total.	
	Red, or sockeye.		Coho, or silver.		Humpback.		Steelhead trout.			
	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.
1906	7,031,480	6,638,550							7,031,480	6,638,550
1907	58,210,000	54,610,800					182,000	143,500	58,392,000	54,754,300
1908	65,550,000	61,369,000							65,550,000	61,369,000
1909	96,380,000	87,978,870	17,000	9,900	12,000	10,000			96,409,000	87,998,770
1910	148,020,000	141,526,770			499,400	363,740			148,519,400	141,890,510
Total	375,191,480	352,123,990	17,000	9,900	511,400	373,740	182,000	143,500	375,901,880	352,651,130

OUTPUT OF PRIVATE SALMON HATCHERIES OF ALASKA, 1893 TO 1910.

NOTE.—Unless otherwise stated in footnotes, all of the fry liberated were red salmon.

Year ended June 30—	Callbreath's hatchery.		Karluk hatchery.		Klawak hatchery.	
	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.
1893	900,000	600,000				
1894	3,000,000	2,204,000				
1895	6,300,000	5,291,000				
1896	6,200,000	5,475,000				
1897	4,400,000	4,390,000	3,236,000	2,556,440		
1898	3,400,000	2,526,000	8,454,000	6,340,000	2,023,000	800,000
1899	3,000,000	2,050,000	4,491,000	3,369,000	3,600,000	3,000,000
1900	3,400,000	2,335,000	10,496,900	7,872,000	3,600,000	[a] 1,000,000
1901	(b)		19,334,000	15,566,800	(c)	
1902	6,000,000	5,500,000	32,800,000	28,700,000	3,500,000	2,800,000
1903	6,000,000	5,000,000	23,400,000	17,555,000	3,500,000	1,500,000
1904	6,000,000	5,000,000	28,113,000	22,000,000	3,000,000	1,700,000
1905	6,050,000	5,250,000	45,500,000	33,670,000	2,800,000	2,000,000
1906	7,700,000	6,500,000	36,933,000	28,236,412	2,800,000	2,300,000
1907	(d)	(d)	38,679,200	36,846,000	3,600,000	1,187,000
1908	(e)	(e)	47,808,200	43,655,000	3,500,000	2,776,000
1909	(e)	(e)	40,320,000	37,105,000	3,500,000	3,200,000
1910	(e)	(e)	45,228,000	40,620,000	5,800,000	5,300,000
Total	[f] 63,350,000	52,121,000	384,793,300	324,091,652	41,223,000	27,563,000

Year ended June 30—	Hetta hatchery.		Quadra Bay hatchery.		Freshwater Bay hatchery.	
	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.
1893						
1894						
1895						
1896						
1897						
1898						
1899	2,800,000	2,600,000				
1900	2,000,000	1,500,000				
1901	1,800,000	[a] 500,000				
1902	2,500,000	1,700,000	4,500,000	3,500,000	1,500,000	1,000,000
1903	4,800,000	4,000,000	5,500,000	4,000,000	(b)	(b)
1904	5,127,500	3,750,000	600,000	[c] 400,000	(d)	(d)
1905	(g)	(g)	(g)	(g)	(g)	(g)
1906	(g)	(g)	(g)	(g)	(g)	(g)
1907	(g)	(g)	(g)	(g)	(g)	(g)
1908	8,000,000	6,125,000	(g)	(g)	(g)	(g)
1909	8,400,000	8,134,000	3,325,000	3,025,750	(g)	(g)
1910	10,313,000	9,000,000	10,863,000	9,850,000	(g)	(g)
Total	45,740,500	37,309,000	24,788,000	20,775,750	1,500,000	1,000,000

[a] Many eggs frozen.
[b] No run of fish.
[c] Hatchery was not used, the eggs being hatched out in the lake.
[d] No report.
[e] Fish coming in to spawn were lifted over the dam.
[f] A considerable proportion of these are coho eggs.
[g] Not operated.

OUTPUT OF PRIVATE SALMON HATCHERIES OF ALASKA, 1893 TO 1910—Continued.

Year ended June 30—	Fortmann hatchery.		Kell Bay hatchery.		Total.	
	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.	Eggs taken.	Fry liberated.
1893					900,000	600,000
1894					3,000,000	2,204,000
1895					6,300,000	5,291,000
1896					6,200,000	5,475,000
1897					8,636,000	6,946,440
1898					13,877,000	9,666,000
1899					13,891,000	11,019,000
1900					19,496,900	12,707,000
1901					21,134,000	16,066,800
1902	11,460,000	10,300,000			62,260,000	53,500,000
1903	40,050,000	29,005,000	2,500,000	2,000,000	85,750,000	63,060,000
1904	22,203,000	13,780,000	(a)	(a)	65,043,500	46,630,006
1905	65,010,000	63,181,000	(a)	(a)	119,360,000	104,101,000
1906	68,715,000	67,643,000	(a)	(a)	116,148,000	104,679,412
1907	105,450,000	80,973,000	(a)	(a)	147,729,200	119,006,000
1908	[b] 41,280,000	33,920,000	(a)	(a)	100,588,200	86,476,000
1909	24,465,000	22,785,000	(a)	(a)	80,010,000	74,249,750
1910	53,340,000	50,725,000	(a)	(a)	125,544,000	115,495,000
Total	431,973,000	372,312,000	2,500,000	2,000,000	995,867,800	837,172,402

[a] Not operated. [b] Includes 30,000 coho eggs taken and 27,000 fry liberated.

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